

Pamphlet Binding

Punching, Crimping
and Quarter Binding

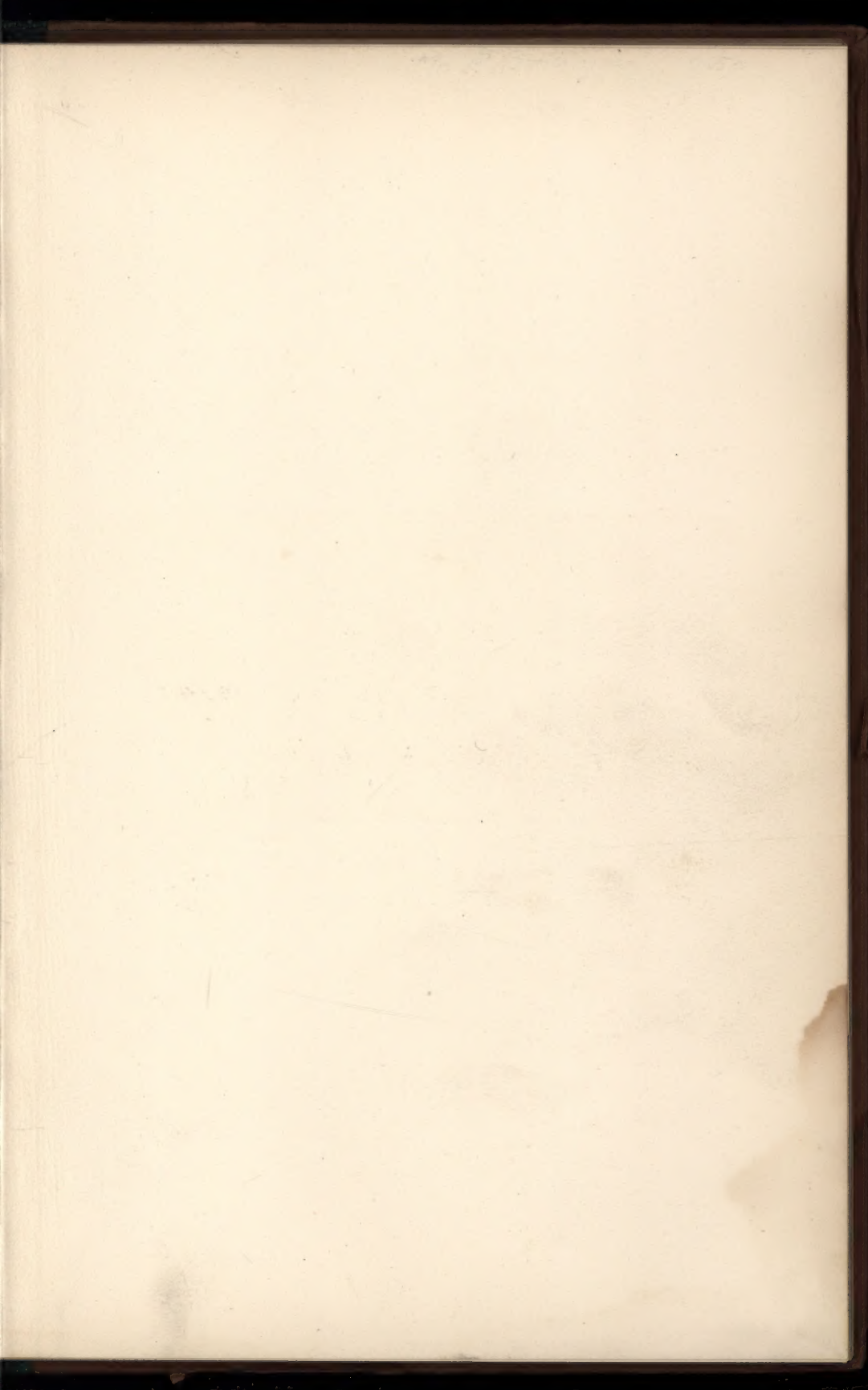
By JOHN J. PLEGER

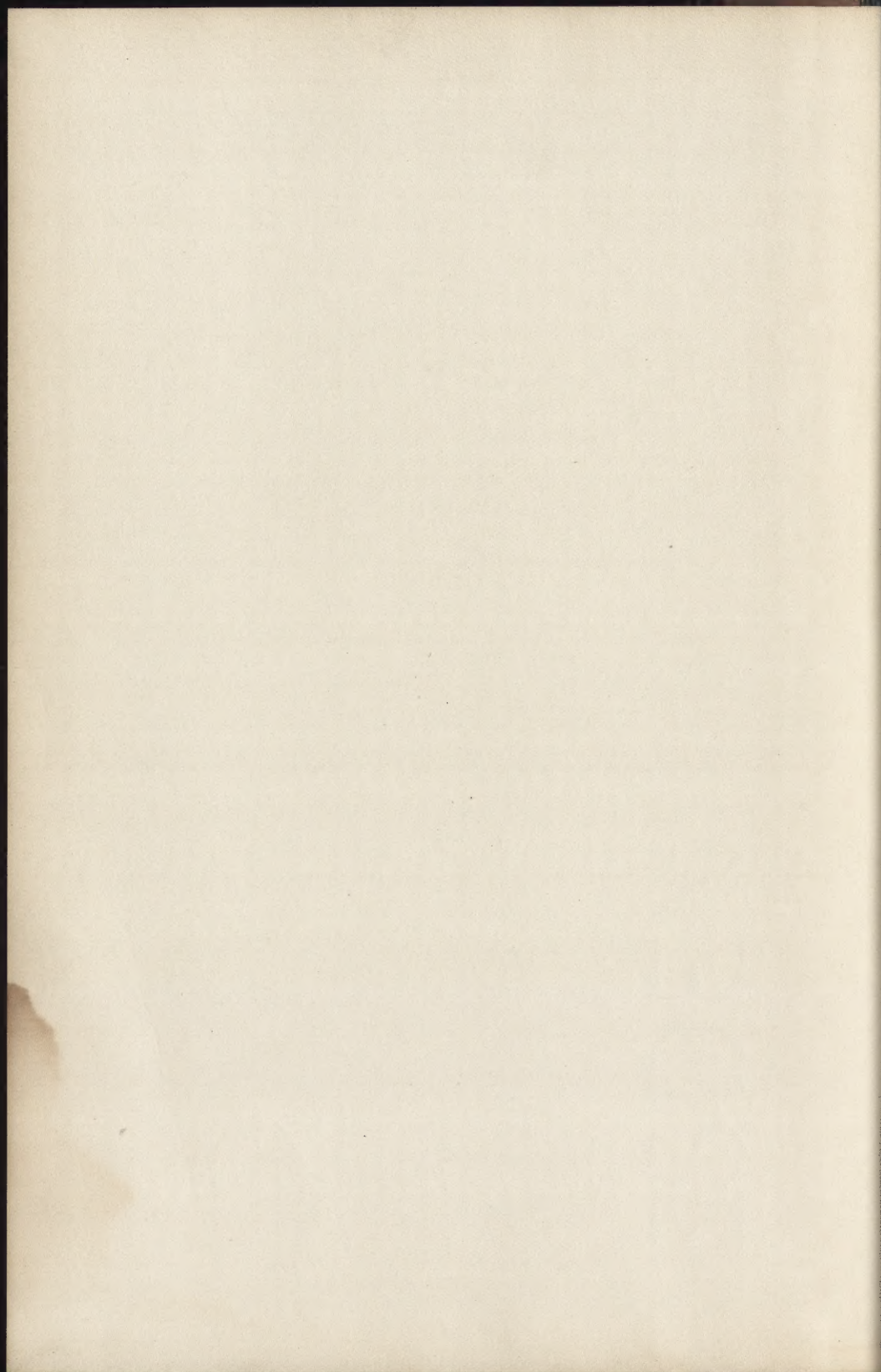
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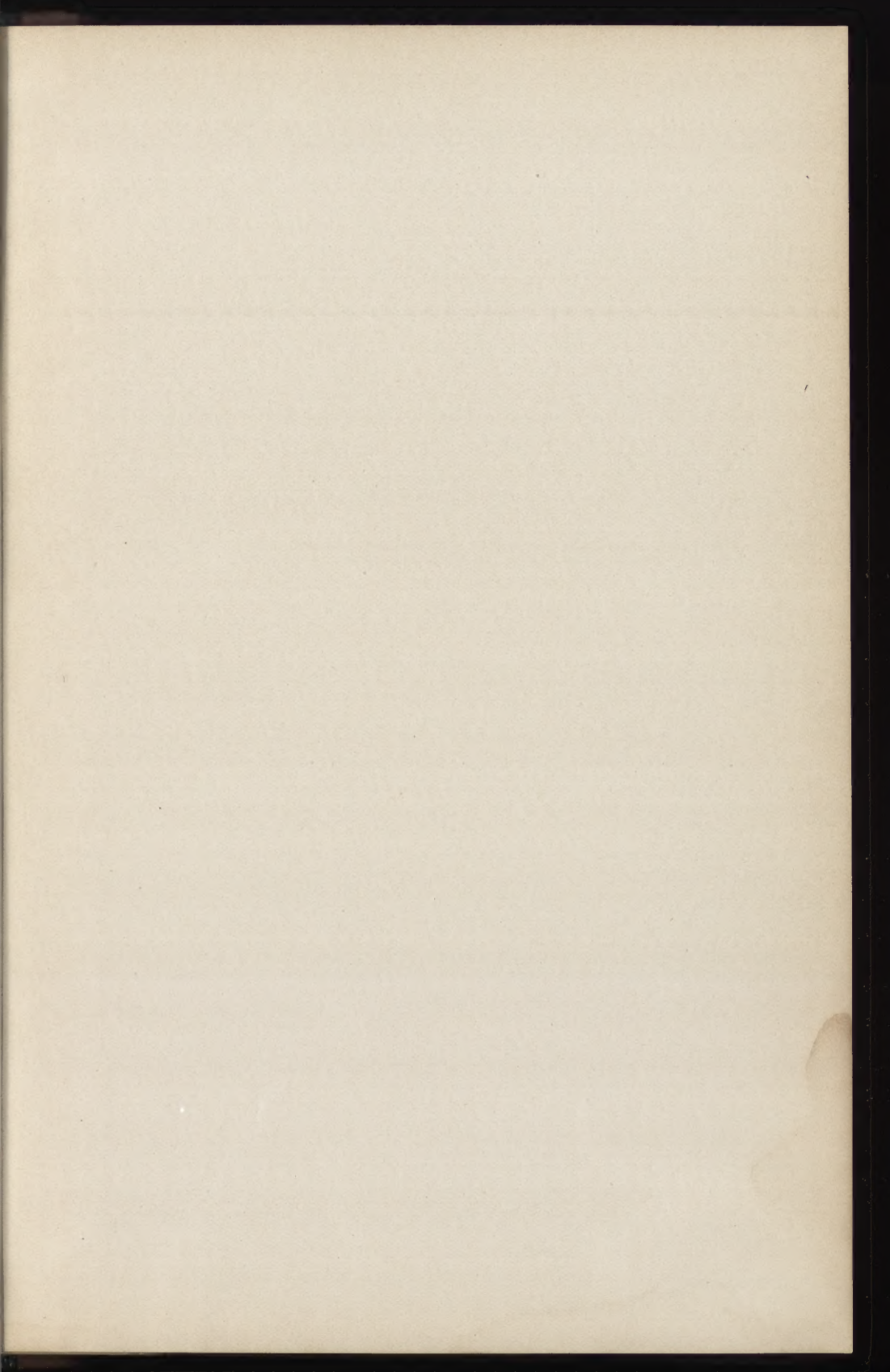
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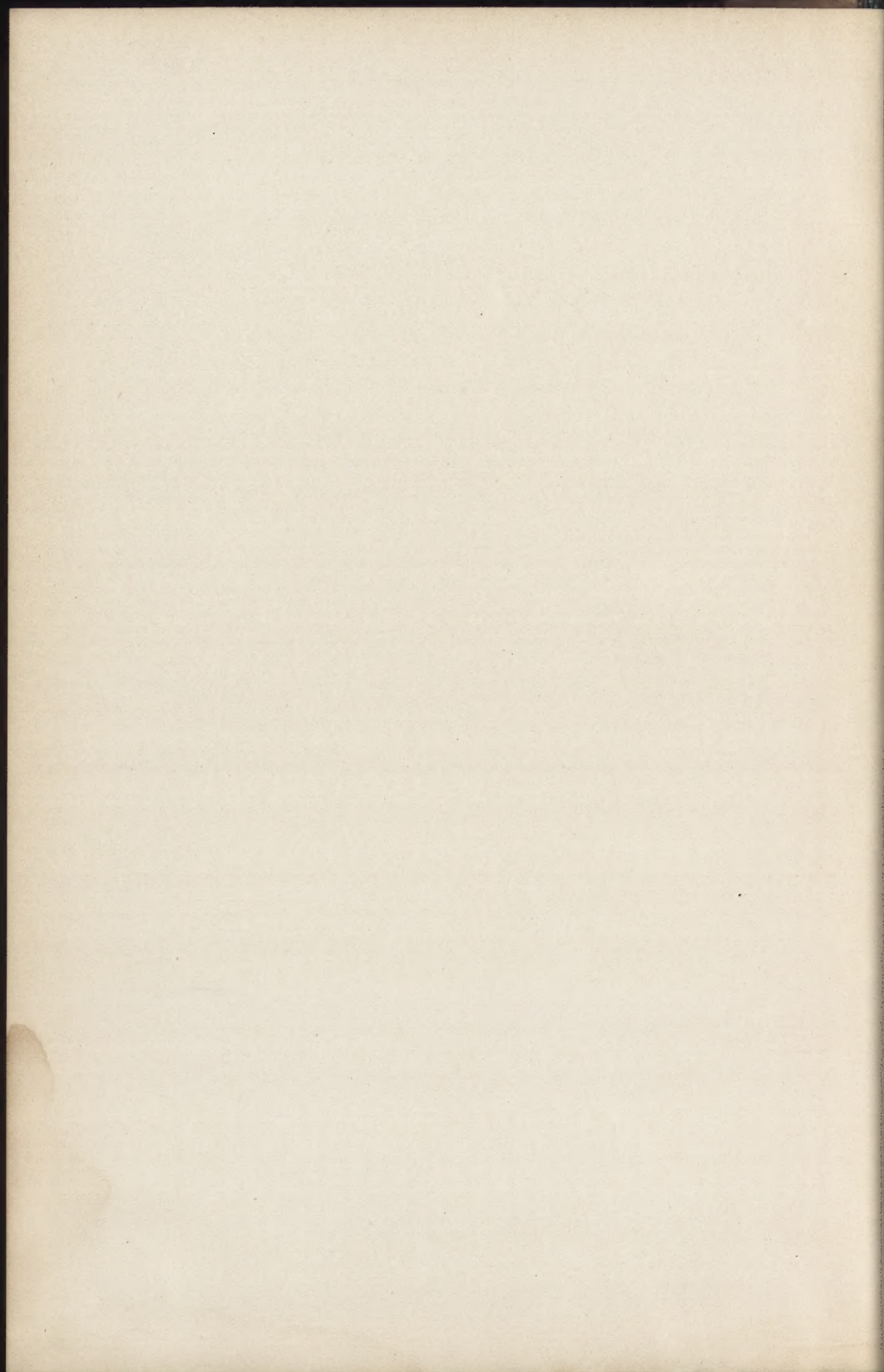
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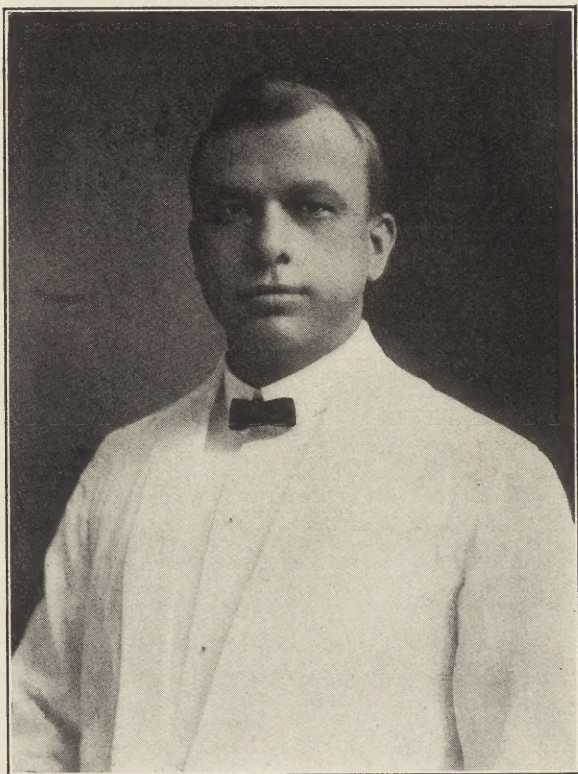








BOOKBINDING



JOHN J. PLEGER.

BOOKBINDING
AND
ITS AUXILIARY BRANCHES
(IN FOUR PARTS)

BY
JOHN J. PLEGER

PART TWO

FUNCHING, CRIMPING,
EYELETING, PAMPHLET AND
QUARTER BINDING

CHICAGO
THE INLAND PRINTER COMPANY
1914

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P55

1914

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Chicago

STUTZMAN ALPHABET
ALPHABET 1914

FOREWORD

It is not laudation of any trade to say that it follows in a beaten path when there is no reason therefor except that methods of procedure are habitual. That the present-day craftsman leaves too much to precedent and habit, and does not exercise enough his power of initiative, is demonstrated clearly by experience in bookbinding. To improve ought to be the constant aim; to do this, the continuation of steadfast methods and styles must be merited by sufficient reasons.

The invention of machinery has given impetus to all branches of manufacturing, and, by the displacement of hand labor, has given a possibility for further development of modern methods, yet we find there is in many binderies labor performed by hand which, with a proper understanding of hand and machine methods, might be done more expeditiously and perfectly with machines. Modern conditions and demands, however, are not an unmitigated advance; coupled with the opportunity for improved methods have come the pressure of competition and the slipshod makeshifts to economize in material and time without regard to the fineness or durability of the product, which puts on the appearance of a genuine article and is a good seller because of the cheapness in price. "Art with cheapness" was the motto of the ancient Greek, and it would be well for the modern man also to adopt that slogan. Cheapness, in contrast to extravagance, is meant, not to be confused with shoddiness. The Greek believed, as we should, that simplicity and plain durability were the methods of attainment. Art in bookbinding should never be overlooked, for art means wholesomeness, and wholesomeness is lost by resorting to shabby, albeit gaudy, styles and materials,

but is gained by better and quicker methods of execution and suitability of design to the theme.

So, changes in, as well as continuation of, methods and styles of bookbinding must be merited by sufficient reasons. The terms of bookbinding are sometimes technical, but at other times are local or accidental. To have terms of value it is necessary to make them universal, so that a science may be based upon them, and one man may profit by the experience of another. It may seem strange, yet it nevertheless is true, that terms are at variance in different localities, and there seems to be no harmonious plan of description.

A demand has arisen for a book for use as a text. The growing generation is composed of students, and there is a demand not only for advanced knowledge among those practicing the art but among many would-be learners for a school, and, more essential still, a text. Craft education is of importance in these days of appreciated handiwork; moreover, among those whose livelihood is earned by such labor, competition is so keen that each laborer must needs strive to perfect himself in order to obtain the rewards of success.

It has been my aim in compiling these pages to treat the subject in a concise and comprehensive manner, defining consistently terms and processes in a way which may be grasped by novices and serve as an aid to bookbinders, librarians and printers who are more or less in charge of office work. To instruct the printer and binder, serve as a court of appeal for the man in the bindery when he should question erroneous work orders, and to aid both in satisfying the requisitioner, these pages are written. The wail for "the prostitution and the decadence of the once proud art of bookbinding" should be quelled by the improvements of to-day succeeded by those of to-morrow in the advance of a "modern bookbinding."

TO PRINTERS.

Bookbinding as understood to-day means putting the sheets together by various methods. It is sometimes argued that pamphlets and manifold books do not come within the category of binding as they are the printer's product. The line of demarkation between the printer's product and the binder's is the printed sheets. Be it menu, pamphlet, pad, manifold, check, letterpress, or account book, if it becomes the binder's task to put the finishing touches to the printer's product, he has as much claim in the entire production as the printer.

Imposition requires a general knowledge of press and folding machine. Hand and machine folding bring about the same results; but to enable other than the usual standard forms to be folded by machine, it is wise to consult the binder as to requirements.

"Signature" is a term applied to all letterpress or document forms, whether four, eight, twelve, sixteen or thirty-two pages. For convenience in gathering and collating, figures denoting the numerical order in which the sheets are to be bound are printed on the first page, at the bottom of the left-hand corner. Publishers who have a variety of work of this nature also print order number in addition to the signature number, as 25641-2. This should be set in eight-point, but, if the book is small, six-point is preferable.

The margins of the printed page should be governed by the trimmed size, and the visual center on the page. Books that are to be side-stitched should have a wider margin in the back to make up for the space taken up by the staple.

The margin on the outside may be greater than the inside without detracting from the appearance of the book, so long as the head and tail margins conform. In

order to make the page the visual center, the tail should always be larger than the head margin.

Books of less than sixty-four pages, which are not required to be sewed on a book-sewer, should have the pages imposed as insets and they should be made into a saddle-stitched pamphlet.

The maker-up should endeavor to secure pages of equal length throughout the book, avoiding as far as possible short and long pages. To facilitate or supersede collating, print a four-point rule or the signature number step fashion in the back marginal fold. This will enable the gatherer to detect misplaced signatures without collating. The folding must be accurate, so that the fold will be in the center of the marker. The folios and markers are the guides for hand folding, and should receive particular attention; otherwise, good register is well-nigh impossible in folding paper. All reprints should have order number and star printed on the first page.

A marker should be placed one-eighth of an inch from the top in all type-forms of cover-pages.

In a receipt or manifold form that requires more than single numbering, set the blanks for the numbers so that they will align with each other in such manner as to permit the numbering machine operator to feed the sheet to the same front guide in each instance.

All side-stitched books require a binding margin, and in no case should less than three-quarters of an inch be allowed. Thicker books require more margin to permit the use of the inner sheets near the stitch.

Particular attention should be paid to the size of paper on which a job is to be ruled and printed. Proper trim margins should be allowed for all classes of work.

All small runs of ruled forms should be ruled before printing. If it be more economical to run a form "work and turn" than "work and shift," it should be done. To facilitate ruling jobs containing interlines or sub-head lines, a marker twelve points long should be set in type-

forms as a guide in striking. This will be covered in down ruling, and will not mar the appearance of the work. On all printed and ruled blank forms a marker should be placed on either side of the form to serve as a guide for the pressman in determining the position on the sheet. This is especially valuable on blanks having one or more box headings on the outside, or where binding margin is desired.

Special care must be taken in casting work that is to be bound, and the chapter devoted to preparing copy and the description of the several styles of binding should be consulted. All casts in blank-book composition should conform to the following standard:

INSIDE AND OUTSIDE MARGIN.

28 Points	Remaining Space	32 Points	32 Points	Remaining Space	28 Points
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The determining factor in all controversies on imposition must necessarily be the convenience of the bindery and the machinery on hand to do the work. An improperly made-up form is one which causes extra labor in handling.

TO PRINTING PRESSMEN.

In laying out or imposing plate forms, care should be taken on margins, guide marks, folding points, and the proper position of the signature page as far as it relates to the fold. On a thirty-two page, the signature page of the first sixteen should be in the lower left-hand corner next to grippers; the signature page of the other sixteen in the lower left-hand space on the third row. The folding points should be in the fold margin nearest the center on the left side, and centered from the corners of the four plates. The guide mark should be placed to print on the edge of the sheet where the sheet touches the guide when fed in. If there is any variation in the trim, it will be overcome by making guides and guide marks hit the

sheet at the same point. The guide mark close to the gripper indicates to the folding-machine operator and the cutter the edge to be used. The guide should be used on the near side next to feeder for the first side, and on the far side for the second side. If the inside of the sheet-wise form be printed first, the guide and the guide mark must be used on the far side.

To save time when folding with machine, maintain the same guide margins on all work of the same size. Guide edges must conform to the requirements of the binding machinery. Perfect register and proper margins in folding can not be had if the sheets are tumbled. Work and tumble forms invariably cause trouble, unless the paper is perfectly square and even. On all calendered or coated, as well as clay-coated paper, the grain must run from top to bottom of the page. If the grain runs across the page, it is certain to crinkle when books are sewed and the backs glued.

To maintain color on bookwork, hold out one sheet of each signature. Do not depend on the bindery to furnish sheets when folding and bundling are done, as this necessitates opening bundles and rebundling.

The sheets, when printed, are sent to the bindery for such treatment as the work demands. All sheets before leaving the pressroom should be straightened and the count verified. The advantages of handling all paper stock in ream lots in pressroom and bindery should not be overlooked, as there is considerable saving in paper. The top and bottom sheets are soiled in handling, and should be left in place. If sheets are spoiled in printing, the pressman should remove them while the press is running, and put them on top of the ream. They can be utilized in the bindery in making dummies or on ruled work in trying the pens. If it be a large run, all the bad sheets except the top and bottom should be laid aside in one pile, and the bindery notified. Were the pressman to destroy the sheets spoiled by crooked feeding, a greater

overage would be required for making ready in ruling and on the folding machine. The saving effected by sending these sheets to the bindery is appreciable when expensive stock is used.

When removing sheets for verification, care must be taken to avoid turning them when placing them back on the pile, as they will be backed up by the wrong pages, and can not be discovered until verified, leaf by leaf, after the book is bound. This verification is seldom done, as the necessity for it does not exist in workrooms where the ordinary precaution is taken.

Markers in covers printed on one side only should have sufficient impression to be visible on the inside of the cover. Failure to do this renders the marker useless as a guide in covering. All sheets should be dry enough to handle before sending to the bindery.

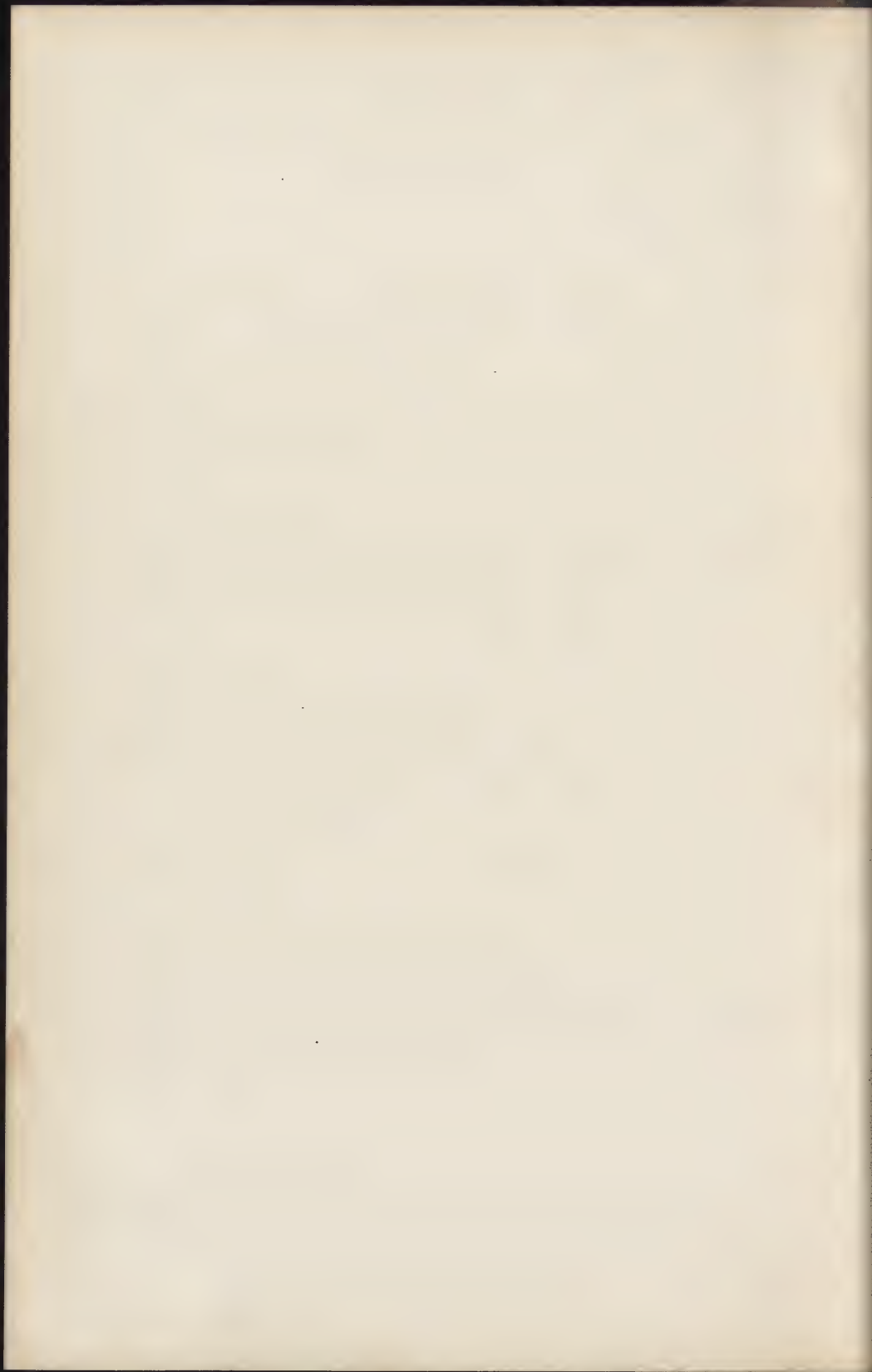


TABLE OF CONTENTS

	PAGE
Binding definitions	1
Bundling	38
Card index tab-cutting	14
Counting	10
Crimping	21
Collating	47
Covering	61
Drilling paper	17
Eyeletting	19
Folding	23
Fiddling	50
Gathering	43
Glue and cement	100
Inserting	41
Jogging	10
Mailing	70
Numbering	76
Punching	12
Perforating	71
Pads	81
Paste	108
Quarter binding	82
Round cornering	99
Stitching, silk	52
Wire	53
Thread	48
Slitting	40
Scoring	22
Tag board, cloth back	66
Trimming	86
Waste-paper baling	98

LIST OF ILLUSTRATIONS

Book trimmer, continuous	95
Duplex	92
Straight-line automatic	96
Automatic	94
Book, side-stitched through cloth back	67
Bundling machine	38-40
Baling press	97
Combination perforating and numbering machine	80
Cutting machine	87-91
Strip and label	90a
Covering machine	63-65
Collating, markers for	47
Crimping machine	21, 22

	PAGE
Drilling machine	17-20
Electric glue pots.....	102-104
Fanning paper for jogging, method of.....	10
For counting, method of.....	11
Folding machines	26-33
Feeders	34-37
Gathering table	44
Machine	45-46
Gauge, duplicating	78
Gluing and gumming machine.....	105-106
Glue heater	100
Mailing machine	69
Numbering machine	77
Paste box	108
Punching machine	12-16
Piling truck	70
Perforators	71-75
Quarter-bound book	84
Round-corner cutter (power).....	98
Stub folded map.....	42
Stitching machine, silk.....	51
Wire	52-56
Automatic	58-60
Side-stitched book, thread.....	48-50

BINDING DEFINITIONS

PROCESS TERMS.

BLEEDING.—Trimming margins of books or printed sheets into the printing.

BUNDLING.—The process of ejecting air by pressing and tying together folded signatures for the purpose of making them solid.

CANCELING.—Cutting out and replacing with corrected pages printed leaves containing errors.

COLLATING.—Examining the signatures after a book is gathered to see that they are arranged in consecutive order.

CREASING.—Bending sheets with a folder.

CRIMPING.—Creasing, bending or mangling sheets from both sides by means of wheels on a machine to permit a flat lay in loose-leaf covers.

CROPPING.—Trimming a book disproportionately or in excess of requirements.

DUMMY.—Pages of a book put together to show the general format of the finished book.

DUODECIMO.—A sheet of a book paper 19 by 24 inches folded in twelve leaves is called a duodecimo, or 12mo.

EYELETING.—Reinforcing punched holes with brass, zinc or aluminum caps.

FANNING OR RUNNING OUT.—Working out the ends of a pile of sheets for pasting, preparatory to tipping.

FOLIO.—An obsolete term for a sheet of book paper 19 by 24 inches when folded in two leaves; the modern folio size is a sheet 17 by 22 inches.

FORM.—A page or number of pages or plates locked in a printer's chase ready for the press.

FORMAT.—The bibliographical term for the physical size, shape and appearance of a book.

GATHERING.—Collecting the folded sheets of a book according to the order of the signatures and pagination.

GUARDING.—Tipping cloth or paper to plates and then tipping or folding the end around the adjoining signature. Joining plates together to be sewed as a signature.

INSERTING.—The act of placing one signature in another, or plates or maps in signatures. The matter so inserted is termed an “inset.”

JOGGING.—Straightening paper.

MAKE-UP.—(1) The number of signatures or illustrations or books needed to complete an order or edition. (2) The layout of the book, showing the order of pages and illustrations.

OCTAVO.—A sheet of book paper 19 by 24 inches, folded in eight leaves, is an octavo, or 8vo.

OFFSET.—The reversed copy made upon a sheet by contact with wet printed matter on another sheet.

OVER-SHEETS.—The signature or sheets remaining after an edition is completed.

PUNCHING.—Cutting holes in cards or sheets.

QUARTO.—A sheet of book paper 19 by 24 inches in size, folded in four leaves, is called a quarto, or 4to.

QUIRE.—The term applied to twenty-four sheets of paper.

REGISTER.—When two or more adjacent colors meet without infringing they are said to be in register.

REINFORCING SIGNATURES.—Pasting cambric around or in the fold of signatures for the purpose of strengthening the paper and binding; often done on the first and last signatures of a book because of the extra strain at those points.

RUNNING OR FANNING OUT.—Working out the ends of a pile of sheets on the end for pasting, preparatory to tipping.

SCORING.—Creasing cardboard or heavy paper so that it will fold neatly at the desired place. This is often done with rules locked in forms, or in perforating machines.

SLITTING.—Cutting sheets apart for inserting plates.

SMASHING.—Compressing folded signatures with a machine to render them more compact for binding.

STARTS.—Leaves which are not properly secured in the back and project beyond the others; breaks between the signatures caused by forcing the leaves when held tightly.

STITCHING.—Fastening sheets together with thread, twine or wire staples by hand or machine.

TABBING.—Cutting a card with an extension for ready reference.

TIPPING.—Attaching paper by applying paste or glue to the end of the sheet or in the fold of a signature.

VERIFICATION.—Inspection of sheets for imperfections.

STYLES OF BINDING.

CARDBOARD OR TAGBOARD, CLOTH BACK.—A stitched or sewed book with cardboard sides and cloth back. On saddle-stitched books the board is reinforced with muslin, then stitched. The board for sewed books is guarded around the outer signatures; for side-stitched books the boards are hinged.

PADS.—Sheets of one hundred or more with a piece of pulpboard on the bottom, one edge glued and reinforced with super.

PAMPHLET.—A thin book with or without a paper cover.

PAPER BOARDS, CUT FLUSH.—A book, slightly rounded, the back covered with goat splits, fleshers, or skiver, boards pasted on, and covered with manila paper. The trimming is done after the book is bound.

PAPER COVER.—A stitched or sewed pamphlet to the back of which a heavy paper is glued or pasted; when saddle-stitched the cover and signatures are stitched in the same operation.

QUARTER-BOUND.—A book with the back of one material and the sides of another; back and sides turned in on the boards.

QUARTER-BOUND, CUT FLUSH.—A book with the back of one material and the sides of another; trimmed after the binding is completed.

QUARTER-BOUND, JUTEBOARD, CUT FLUSH.—A binding which consists of marbled or grained boards, hinged with cloth, stapled, with a cloth back and trimmed flush.

TABLETS.—Sheets of one hundred or more with pulp-board on the back, covered with manila paper over the binding edge to the back; or with cardboard on the front, the back covered with cloth.

PARTS OF A BOOK.

DOUBLE FOLIO.—Folio page together with smaller folio inserted within; the whole makes one complete accounting form.

END-LEAVES.—The outer leaves of end-papers which are pasted to the cover.

END-PAPERS.—The outer leaves of books.

FIGURE.—An illustration inserted in printed text.

FLY-LEAVES.—The leaves of end-papers next to the bound book.

FOLIO PAGE.—The two pages of an open account book which make one complete accounting page.

FRONT MATTER.— That which precedes the main text of a printed book; namely, half-titles, title-page, contents, preface, etc.

HALF-TITLE.— The title of a volume appearing above the text on the first page or on a separate leaf immediately preceding the first page of text.

HEAD AND TAIL.— Top and bottom of a book.

IMPRINT.— The name of the printer or publisher affixed to his work.

PAGE.— One side of a written or printed leaf.

PLATE.— Full-page illustration printed on paper different from that used in the book.

RIBBON MARKER.—A small ribbon placed in a book as a marker.

ROUND.— The convex back which corresponds to concave fore edge of a book.

RUNNING HEAD OR TITLE.— The title of a book or subject placed at the top of each page.

SECTION.—Account sheets folded in the center in lots of four or more preparatory to sewing.

SIGNATURE.—A sheet after it has been folded and is ready to be gathered. It usually consists of sixteen pages, but may comprise four, eight, sixteen, thirty-two, or sixty-four pages.

TIGHT-BACK.— The covering material which is pasted to the sections after the book is rounded and in boards.

WASTE LEAVES.— The outer leaves of tight-joint letterpress books, which are removed before the joint material is pasted to the board. The outer leaves of account books which are made into hinges.

BINDING MATERIAL.

ART CANVAS.—A book cloth known both as Art Canvas and Buckram.

BASKET CLOTH.—This is a fancy weave of cloth, of construction similar to the wicker-work of baskets.

BINDERS' BOARD.—A millboard used for binding books (see Clothboard).

BOOK CLOTH.—Cloth used for making covers or cases for books. It is made in many different grades and patterns (see also Cloths).

BUCKRAMS.—These are the heavier weaves of cloth finished like linens. They should be used on letterpress work whenever the books will receive more than ordinary wear.

BUFFING.—The inner layer of cowhide, taken off by buffing or splitting the hide.

CANVAS.—A heavy cotton cloth, close woven (see Duck).

CLOTH.—A stiffly sized and glazed variety of cotton or linen cloth, usually colored and decoratively embossed.

CLOTHBOARDS.—A cheaper grade of binders' board.

COMMON CLOTHS.—Before receiving the final coat of color, this cloth is dyed. The thready appearance noticeable in the linen-finished cloths is less apparent on account of the dye and extra coloring.

DUCK.—A heavy cotton cloth, firmly woven and smooth (see Canvas).

DRILLING.—A stiff cotton cloth.

ENAMELED PAPER.—(See Supercalendered Paper.)

JUTEBOARD.—A fibrous board, sometimes grained or marbled by printing, used on quarter-bound cut-flush books.

KERATOL.—A waterproof cloth made in imitation of leather.

LEATHERETTE.—Cloth or paper prepared in imitation of leather.

LIBRARY BUCKRAM.—A special heavy-weave cotton

cloth suitable for letterpress books. It is dyed and covered with a light coat of color.

LINEN CLOTHS.—Thready-appearing fabrics which have received a light coat of color.

LITHOGRAPH PAPER.—Colored patterns made by lithographing; used for end-papers and siding the cheaper grade of books.

MARBLE PAPER.—Paper decorated with patterns made by marbling; used for end-papers and siding the cheaper grade of books.

MILL OR BINDERS' BOARD.—A thick, heavy card, used for making book covers (see Clothboard).

POLISHED BUCKRAM.—Uniformly colored fabric of tensile strength, to which decorations are easily applied.

PULPBOARD.—A soft, cream-colored board used for pads and tablets.

SHEET.—A separate piece of paper of definite size; a twenty-fourth part of a quire. In printing, a sheet is defined by its size; in binding, by its fold.

SILK PATTERN.—Embossing in small diagonal lines which gives the cloth a silken appearance.

SKIVER.—The outer or grain side of sheepskin which has been split; much used and mistaken for sheep.

STRAWBOARD.—A dull yellow board used for bound manifold work.

SUPER.—A thin, loosely-woven, starched cloth, glued on the backs of books.

SUPERCALENDERED PAPER.—A class of paper to which a glazed surface is given by rolling or calendering.

TAGBOARD.—A thin, tough, cream-colored cardboard.

TAPES.—Strips of tape extending over the back and on the boards to strengthen the binding. Strips of cloth placed between the covers and ends of a stitched book to strengthen the book.

TARBOARD.—A tough and better grade of millboard, containing a quantity of tar; used to make the spring backs of blank-books.

TEXODERM.—Imitation leather, strong, durable; water, stain and Croton-bug proof.

TOOLS AND ACCESSORIES.

AWL.—A tool used to punch holes in boards to lace-in soft twine, thus connecting boards with sewing. Sometimes called a bodkin.

CARBORUNDUM STONE.—A stone one side of which is coarse, the other smooth; used to sharpen knives.

CASE GAUGE.—An instrument consisting of two similar steel parts shaped as the sides of right angles. Two sides of the angles are parallel and the other two in a straight line, operating on a steel bar and adjusted with thumbscrews to suit the backs of cases.

DIVIDERS.—Instrument, consisting of two movable legs, used to measure the distance between bands, in cutting stock, patterns, etc.

FOLDER.—A piece of bone or hardwood about seven-eighths of an inch wide and nine inches long; used for folding paper, turning in, rubbing down, and setting heads.

GLUE BRUSH.—A copper-bound brush with four-inch bristles and about two and one-half inches in diameter; used for spreading glue on binding material, gluing backs of books, etc.

GLUE HEATER.—A tank containing glue kettles.

HAMMER, BOOKBINDERS'.—Special hammer, six inches from apex to base, the base being two inches in diameter; used primarily for rounding and backing books.

PARING KNIFE.—A knife about six inches long, the blade of which is ground on one side to a fine edge; used to pare or skive the ends of leather.

PASTE BOX.—A box made of hardwood, the inside being lined with zinc or galvanized iron and having a stick across one end to enable the forwarder to work surplus paste out of the brush into the box.

PASTE BRUSH.—See Glue Brush.

PRESSING BLOCKS.—Wooden blocks used to fill up space in a standing press.

PRESSING BOARDS.—Hardwood boards, seven-eighths of an inch thick, put between books, sheets, etc., in pressing.

SHEARS.—An instrument for cutting cloth and paper, consisting of two pivoted blades which meet each other.

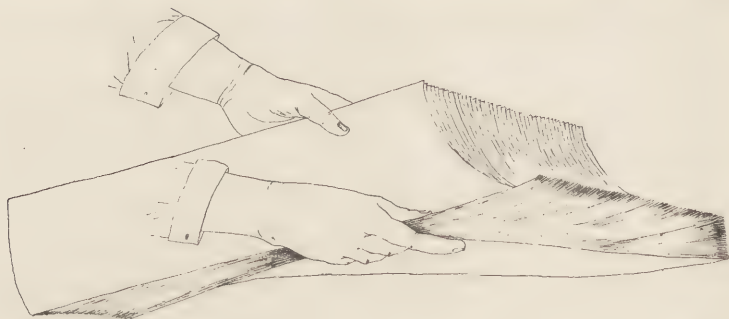
STOCK KNIFE.—A small pointed knife used in cutting leather, etc.

STRAIGHT-EDGE.—A flat metal ruler.

PAPER OPERATIONS.

JOGGING.

This is a common term in the bindery and applies to straightening paper, pads, or books. All books must be jogged at the head before sewing, stitching, and trimming. To jog paper, place the sheets in a pile, the length being from left to right. Then slip the index finger of

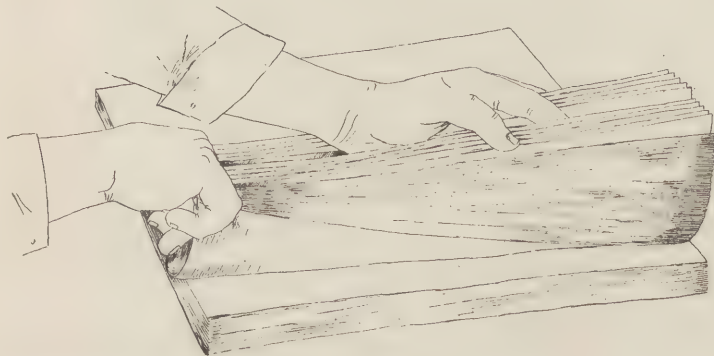


each hand under the respective ends of the pile, the thumb lightly resting on the top sheet, and bend up the ends toward each other, making the top sheet concave. Pinch the thumbs and index fingers tightly together, and straighten the pile back to a plane. The top sheet will be smooth; the others, curved out, away from it. Lightly drop the pile flat upon the table; then pick up and stand on edge. This is repeated until all the edges meet to make an even edge lengthwise of the pile. Then turn the paper the other way and repeat the process to make the width edge true.

COUNTING.

A work order, with full instructions covering every detail of the work, should accompany all work sent to the bindery. The quantity received should be verified.

Shortages should be reported immediately upon receipt, so that should it be necessary to reprint, it may be done before the type is distributed. The quantity received should be entered in the space provided for that purpose on the work order. Letterpress or ruled sheets should be counted in five-hundred lots; pads, tablets, or manifold books in accordance with the number required by the work order for binding. The counting is done by placing the left hand tightly upon the paper, and taking up approximately seventy-five sheets with the right hand on the corner edge of the paper. Fan it out with thumb and index finger; then with the thumb of the left hand

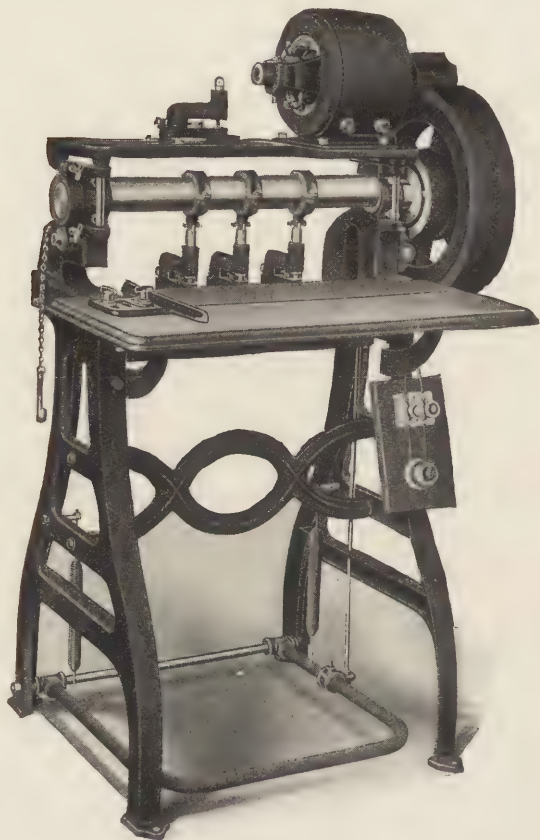


count five and hold back with the index finger. Repeat until a hundred is counted; lay the lot back and continue to five hundred; then straighten the pile and lift off on a platform.

In counting cardboard, the cards are slightly held with the left and run out with the right hand. Count five with the thumb of the right, and hold back with the index finger. The cards are laid off in convenient lots, and the operation continued. When the work is counted, it should be sent to the division where the next operation is performed.

PUNCHING MACHINE.

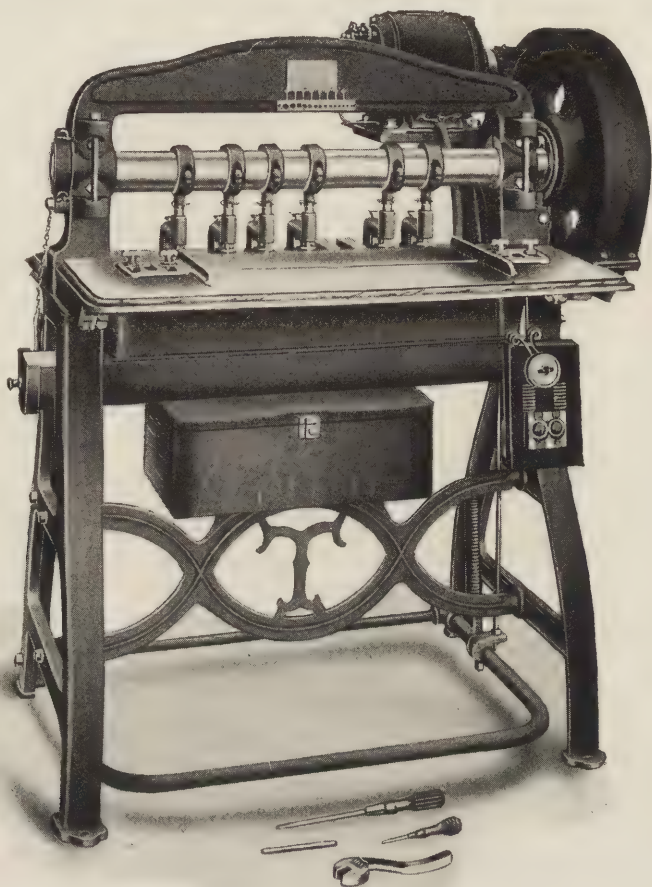
Since the universal use of loose-leaf books, many styles of punching machines have been designed; the best, however, are the multiple punching machines. These are provided with special punches and combination



Tatum Punching Machine.

punch members, which are readily adjusted. The style of hole is selected to fit the loose-leaf binder or the rods in the file cabinet. Considerable time can be saved by

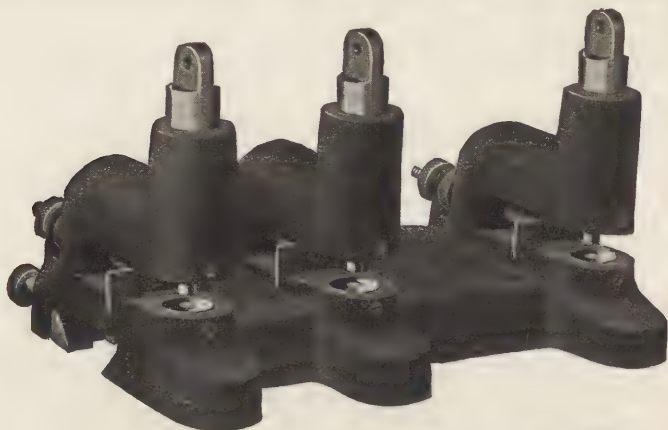
punching two or more file cards on a sheet and afterward cutting them apart. Whenever practicable, the sheets should be printed with the card heads in the center, to enable punching the ends with one turn. There are



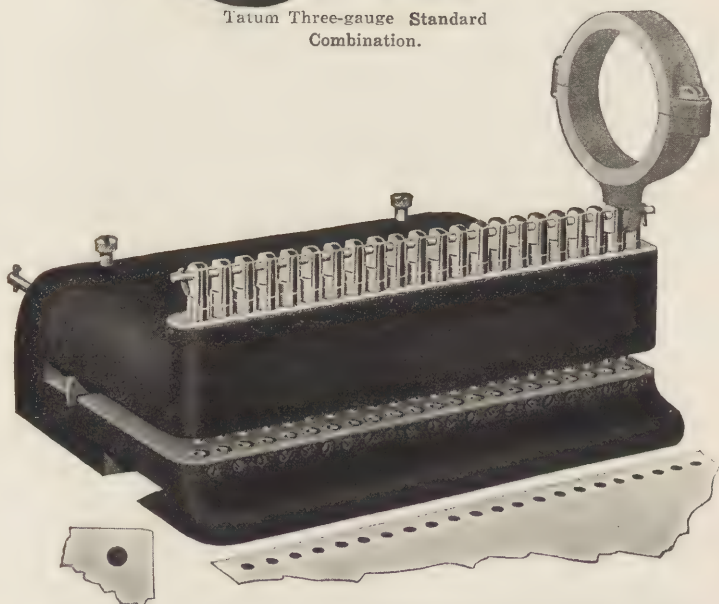
Tatum Punching Machine.

attachments for other operations which are adjusted in the same manner as the punching members, and these add to the value of the machine.

CARD INDEX TAB-CUTTING.—Whenever the amount of work does not justify purchasing a separate machine, it



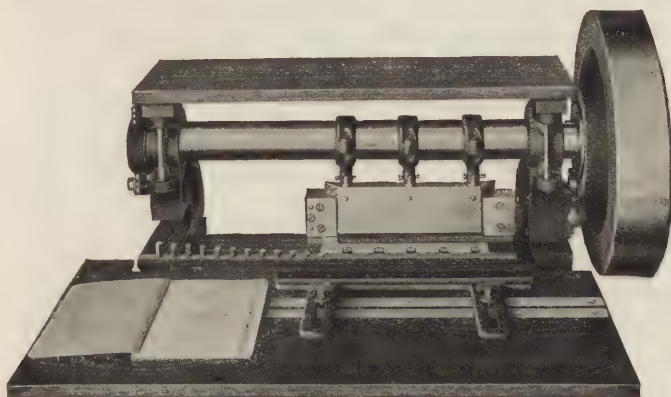
Tatum Three-gauge Standard
Combination.



Tatum Multiple Punch and Die Block for 14-hole square section rings.

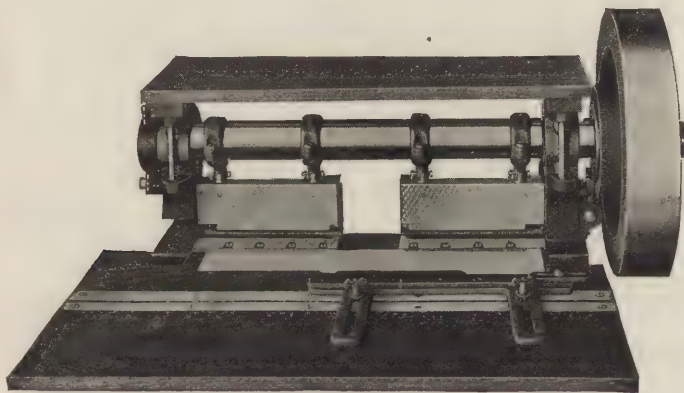
can be supplied as an attachment to the punching machine. The adjustment of the attachments and blades

therein is simple. They can be furnished so as to cut the tabs on the cards any width within the range of the card; the standard heights are three-sixteenths, three-eighths,



Tatum Tab Cutter.

and one-half of an inch. The cards are fed into the blades from a sliding carrier or table which moves across the



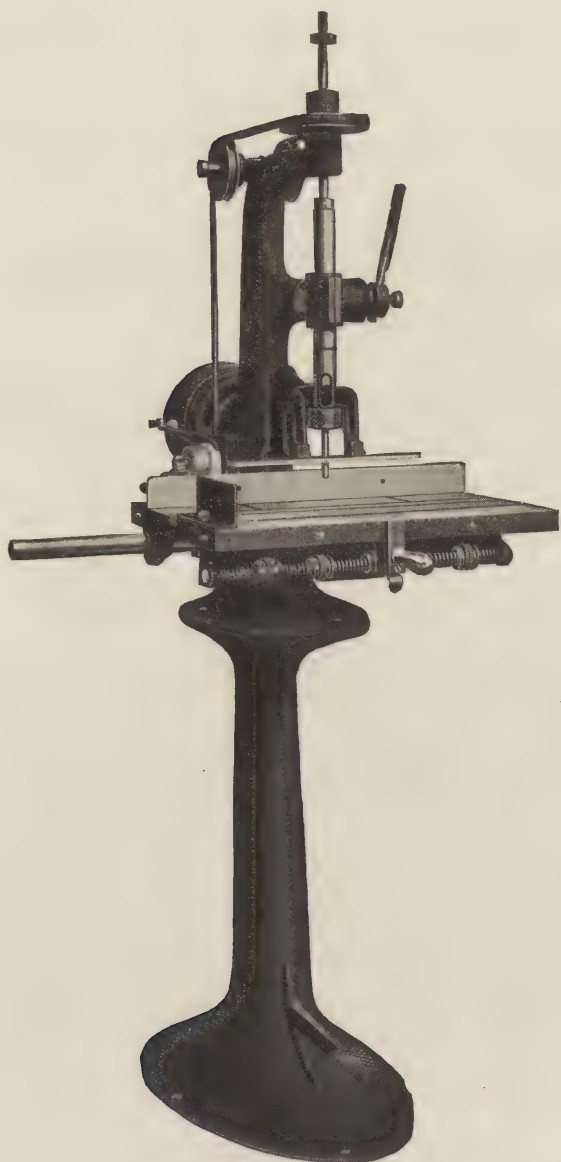
Tatum Tab Cutter.

face of the blade; this makes it possible to cut the tab at any point on the top of the card. An adjustable card carrier is also supplied.

The standard body sizes are 5 by 3, 6 by 4, and 8 by 5 inches. The width of the card varies in proportion to the height of tab required; that is, a three-eighths of an inch tab on a 5 by 3 card would require a card 5 by $3\frac{3}{8}$ inches.



Punches for Tatum Machine (reduced).



Tatum Paper Drill.

Due to the amount of handling these cards are subjected to, a narrow tab is not to be desired. It is customary to cut the tabs for alphabetical cards one-fourth or three-eighths of an inch wide; much more serviceable is a tab three-fourths of an inch wide. A soft cardboard should be condemned for this purpose and the best bristol-board used.

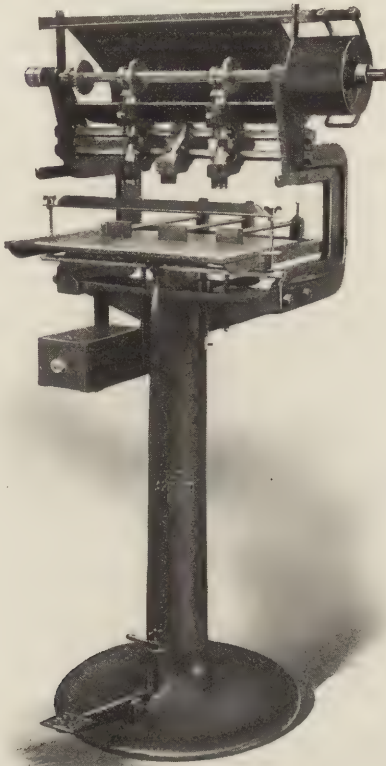


Hickok Paper Drill.

PAPER DRILL.

These machines are designed to drill holes in thick work of a character where the padding or binding is done before punching, and where the thickness required to be punched will not permit the execution on a punching machine. There are numerous styles in the market, ranging from one to four drills, which are adjustable.

Gauges are provided for the table. As clear-cut holes can be drilled on a single sheet as in a pad two inches thick.

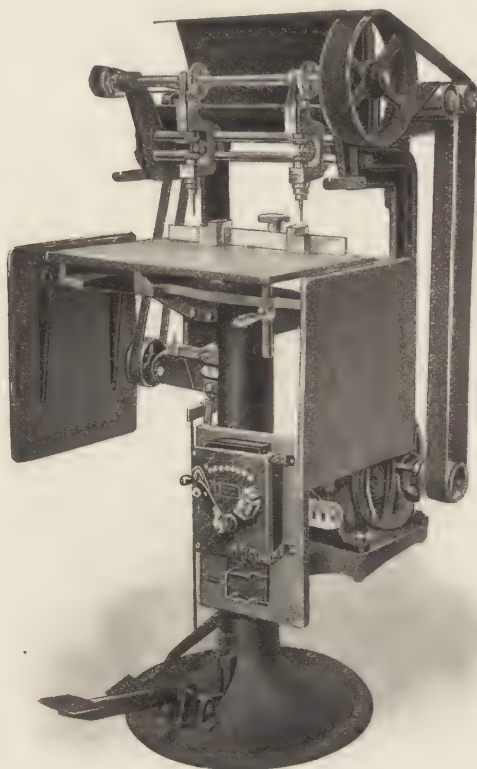


Berry Paper Drill.

PUNCHING AND EYELETING.

Shipping tags, property cards, calendars, samples of cloth, paper, or board are eyeleted to strengthen the holes, and in the case of samples to permit spreading them out while still held together. Eyelets are made of brass, zinc, aluminum; these are fed into a grooved arm by brushes which have a circular movement in the box. All material

must be punched a trifle larger than the eyelet to be used, and is then placed on a tooth which is met from below with a similarly shaped tooth. This picks up one eyelet at a time from the feeder, guides it into the hole of the material, and clinches it firmly. There are different

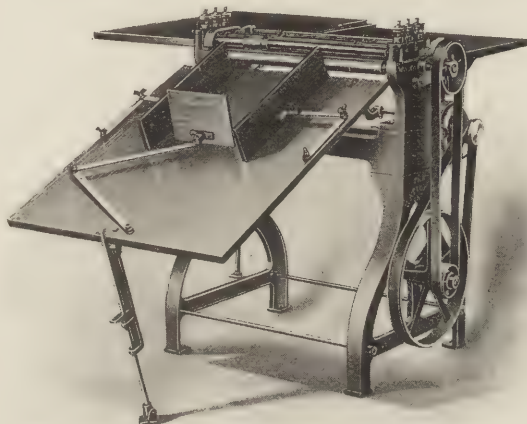


Berry Paper Drill, with automatic table lift.

feeders which are easily adjusted for the different sizes of eyelets. Until recently, this operation required two machines, but this is now combined in one, which, after the material is punched, carries it automatically to the eyelet.

CRIMPING.

The backs of loose-leaf covers consist mainly of posts between which the sheets are clamped. Such an arrangement prevents the flat lay of the sheets, especially of a heavy quality of paper, in the open book. There are specially made papers, which are thinner in the joint, to enable a flat lay, but as these papers can not always be carried in stock, the crimping machine has been designed to provide a substitute. Crimping wheels can be furnished on slit perforators, but whenever the quantity of work justifies it, a separate machine is preferable. The



National Crimping Machine.

rotary creaser will produce a soft hinge up to $1\frac{7}{8}$ inches on any grade or weight of paper. There are four pairs of creasing rollers, arranged in tandem of two sets on each end. This double action thoroughly mangles the paper and leaves it soft the full width of the crease. The third set (two pairs) of rollers are perfectly smooth, and they iron or flatten the creases and take the swell out of the paper to allow the hinge portion to be written on. Two styles of crimping can be had as ordered: one eight

crimps to the inch, in width from $\frac{1}{8}$ to $1\frac{7}{8}$ inches; or twenty-four crimps to the inch, the spools being $1\frac{1}{2}$ inches wide.

The micrometer provides an accurate and instantaneous means of adjusting the creasing or smoothing rolls. It gives an adjustment to the thousandth part of an inch; and the locking device prevents it from working or jarring loose. After the proper adjustment for a certain weight of paper has been made, records should be kept so



that on subsequent orders the machine can be set by turning the micrometer set-screws to the proper numbers. Full-size sheets can be crimped at one operation on both ends; afterwards cut to the size desired. The strength of the paper creased is not impaired, and yet the sheet will be flat.

The scoring spools can be adjusted for single scoring or for hinged cover work from one-eighth of an inch up to any width desired within the limits of the machine. It will slit heavy cardboard as well as any paper stock.

FOLDING PAPER.

The first process in bookbinding is the folding of sheets into convenient sizes and thicknesses. To do this the imposition on the sheet when folded must be in numerical order. All letterpress forms are referred to as signatures.

The ancient designation of sizes is as follows: folio, quarto, octavo and duodecimo. These names signify the number of leaves into which a sheet of paper 19 by 24 inches has been folded. A folio is made up of one sheet of paper, folded in the center, forming two leaves and four pages. The sheets of a quarto have a second fold, making four leaves and eight pages. Octavo sheets have three folds, or eight leaves and sixteen pages. Due to the many different sizes of paper made, these terms have become obsolete, and the page size is now given.

All folding should be accurate, so that when running through a book the pages maintain a true register and are exactly on top of each other. Care must be exercised on sheets printed with small margins, as discrepancy is obvious. To fold with the print means to register the printed pages in folding so that when holding the folded sheet to the light the printed matter and folios are exactly on top of each other. Sixteen-page signature is the standard imposition for letterpress work. Provided the paper is thin, the sheets can be imposed in thirty-two pages. The standard paper is a trifle too heavy for bookwork made up in thirty-two page forms, as the sections when trimmed on sewed books show starts and are rendered unsightly. As one guide is, or should be, used in printing, considerable speed can be attained by folding to the edges instead of with the print, or folios. The sheet can be gauged above or below the edge so that register is obtained without the extra labor of looking at the print or folios. Verification should be made every fifty sheets.

In the following description of folding the page, numbers are given for the first signature: the operation is, of course, continued in like manner on all signatures.

HAND FOLDING.— Four-page forms have but one fold and are usually folded five sheets at a time. They are then placed with the inner faces toward the table and run out with a folder. The sheets are picked up one at a time with the right hand, transferred to the left, and then rubbed down.

Eight-page forms are double the size of four-page forms in the same size page, but have two folds. The folding is done by running out the sheets to the right of the operator, picking up the sheet on the edge with the right hand, bringing it over to the left, registering it with the pages; and then the folder is run forward over the paper. The farther end of the folded sheet is picked up with the left hand, brought over and registered with the opposite page, then the folder is run across the paper from right to left, and the completed signature laid aside with the left hand. Care must be taken to register the page forms on each other to obtain even margins through the book.

Twelve-page forms for the same size page are three times the size of four-page forms, and have three folds. A marker is usually put in the form in printing between pages 8 and 11 to expedite and assure registering of pages 4 and 9 with pages 5 and 8. Fold by bringing the right end of the sheet over to the aforesaid marker, registering with the center forms; then crease with the folder. With the right hand bring the folded right end over to the left and register page 3 with page 2, and 10 with 11. With the left hand pick the farther half of the folded sheet, put the folder tight above the prospective fold to break the paper in the fold; bring the paper over, registering pages 6 and 7, and crease.

Some printing-offices make up a twelve-page hand fold in such a way that the sheet, after the first fold has been

made, must be turned before the second parallel fold can be made. This is obviously extra labor; besides in sewing or saddle-stitching the picking up is more difficult.

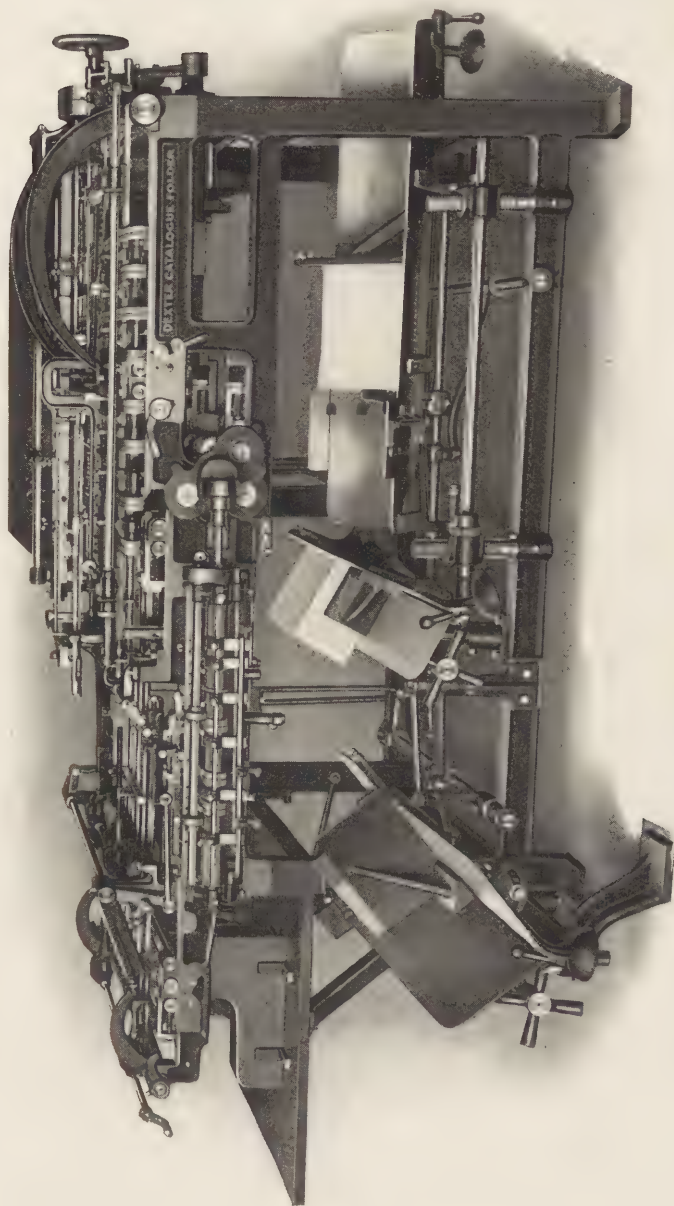
A sixteen-page form is twice the size of an eight-page form in the same size paper, and in folding the paper it is laid with page 1 facing the table to the left and fanned out at the right. Pick up the right edge of the sheet with the right hand, bring it over to the left, registering pages 2 and 3, 6 and 7, etc., and crease. The farther end of the folded sheet is picked up with the left hand, and brought over, registering opposite pages; then creased from right to left. Shift the sheet, bringing the last fold from the horizontal to the perpendicular at the right. Pick up the farther end with the left hand, put the folder tight above the prospective fold on the edge of the fold to break the paper, bring the paper over, register it on the opposite page, and crease from right to left. The sheet is then laid aside with the left hand and the operation continued.

Thirty-two-page forms are double the size of sixteen-page forms for the same size paper, and have four folds. The operation for three folds is the same as for sixteen-page forms. Proceed with the fourth fold exactly as above described for the third fold. To avoid buckling on heavy stock, the sheets must be cut two-thirds the length through the third fold, the folder placed tight over the prospective fourth fold, and the farther end brought over to register with the opposite page.

FOLDING MACHINES.

There are many different machines which fully cover all hand folding operations, including letter or circular folding for office use.

The Dexter 290, rated to take sheet from 14 by 19 to 32 by 44, can, with a few minor changes, be made to take sheets from 12 by 18 to 38 by 50. It will make from one



Dexter Nos. 289, 290, 291 (according to size). Three-in-one job folder.

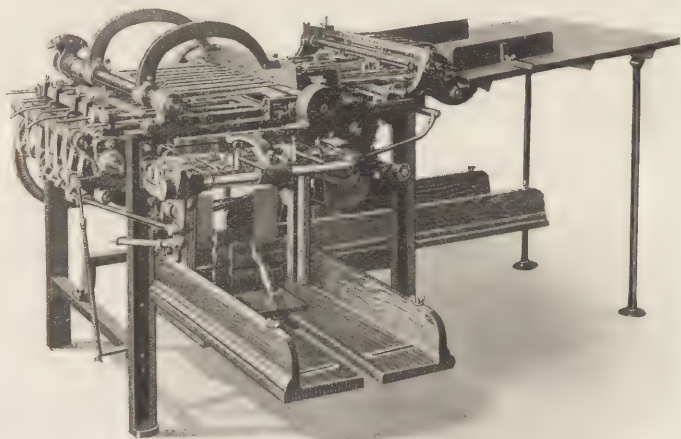
to five folds, delivering from 4 to 48 page forms in gangs of two or more up, right angle, oblong or parallel.

With attachments, it embraces three distinct machines: A complete right-angle book and pamphlet folder, delivering eight, twelve, sixteen, twenty-four, or thirty-two pages; a complete parallel folder, delivering in gangs four, six, eight, twelve, or sixteen pages, all parallel folds; an oblong folder for catalogue or oblong music folds, delivering eight, twelve, or sixteen pages. Twenty-three distinct forms, ranging from six to forty-eight pages.

In addition to the forms mentioned above, a variety of other forms may be made up to run on this machine by making the last fold by hand. This is advantageous on work such as time tables and maps where hand-folding would be slow and expensive, and for sheets of large size, inaccurate. The machine will fold the sheets accurately enough two or more up so that after the extra hand-fold is made they may be cut apart in the cutting machine.

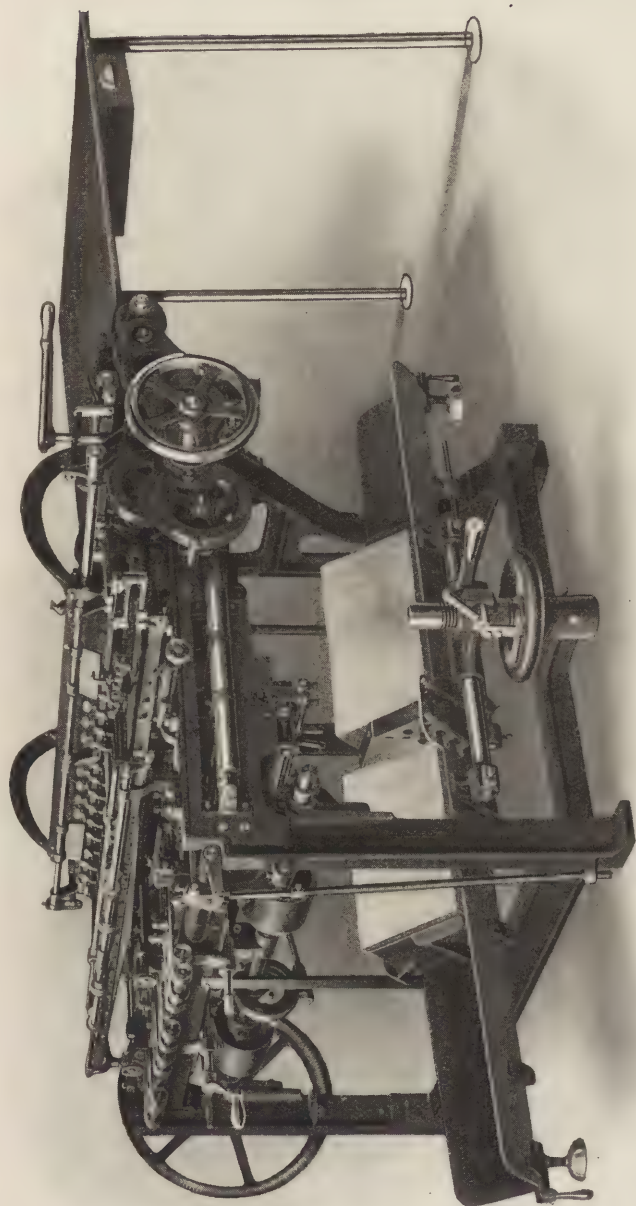
WORK-AND-TURN OR "FLOP SHEET" FOLDING MACHINE.—It is customary when printing a work-and-turn, or "flop sheet," to cut the sheet in two parts on the press when the last impression is made. This requires the handling of two half sheets separately and folding each half separately. To overcome this, a machine has been placed on the market by the Brown Folding Machine Company, Erie, Pennsylvania. This machine will fold the full printed sheet by cutting it in half and turning one-half over while the first half is being folded. This may be done on either sixteen or thirty-two page forms. A single sixteen or thirty-two can also be folded by using one-half of the machine. It will also fold two separate jobs at one time by using both sides of the machine, one as a sixteen and the other as a thirty-two. It will fold the half of a full sheet on one side and a quarter of a full sheet on the other side, giving two dif-

ferent jobs at the same time. This, of course, requires two hand feeders. If automatic feeder is attached, one man can run two jobs at the same time. It is very compact, taking up no more floor space than a single machine. It has automatic register at all folds. It has driven perforators at head-folds. In order to get the best results from the two machines heretofore mentioned, it is necessary to have a man who understands make-up of forms and who has enough mechanical knowledge to overcome apparent difficulties. Folding machines, as a rule, admit of "stretching" above the size stamped on the frame by the manufacturer. It is also possible to run sheets smaller than the minimum given by the maker by means of building up gauges, or taking off tapes. A little fish glue and pieces of board, a cardboard, a piece of wire or an extra idler can be made to serve for special jobs that otherwise could not be run.



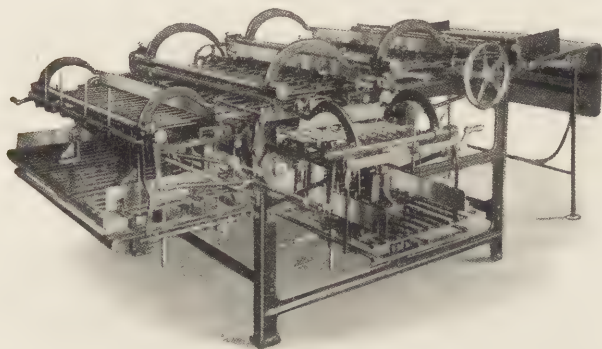
Parallel Push-feed Folder, capacity 6,000 sheets per hour.
(C. F. Anderson.)

Parallel folders can be added to the standard machines, to fold double sixteens or double thirty-twos,



Dexter Double 16 or 32 Folder.

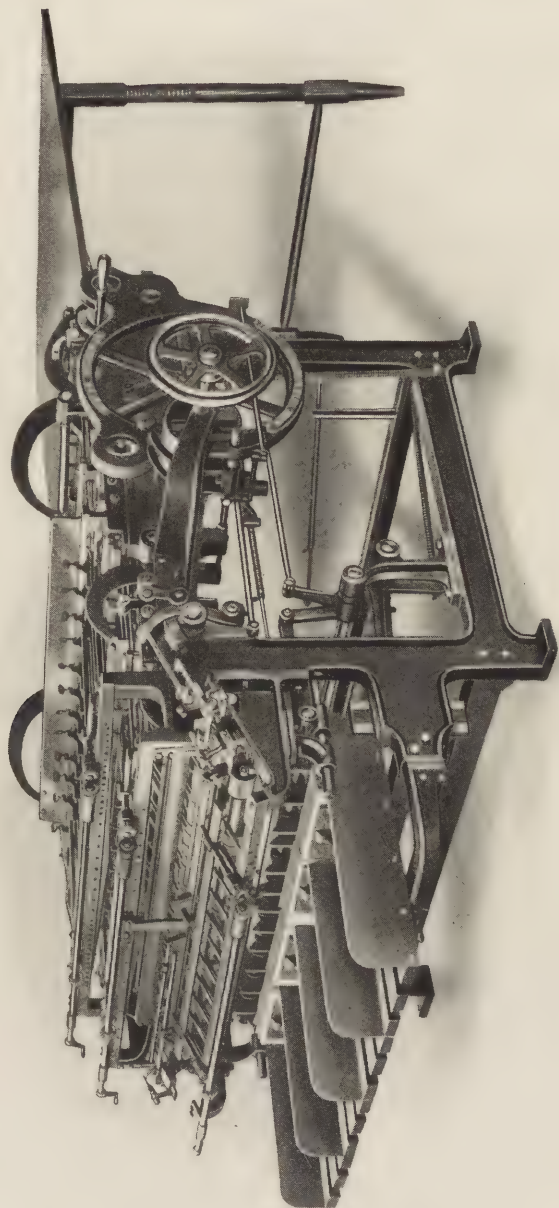
The double sixteen drop-roll folder will deliver two separate sixteen-page signatures or insert one in another, thus delivering one thirty-two-page signature. This machine can be had with an attachment which will deliver two separate thirty-two-page signatures. It will also deliver two eight-page signatures. Small runs of single sheets can be folded economically. A tipping attachment is furnished with these machines.



COMBINATION PARALLEL AND RIGHT-ANGLE FOLDER.—

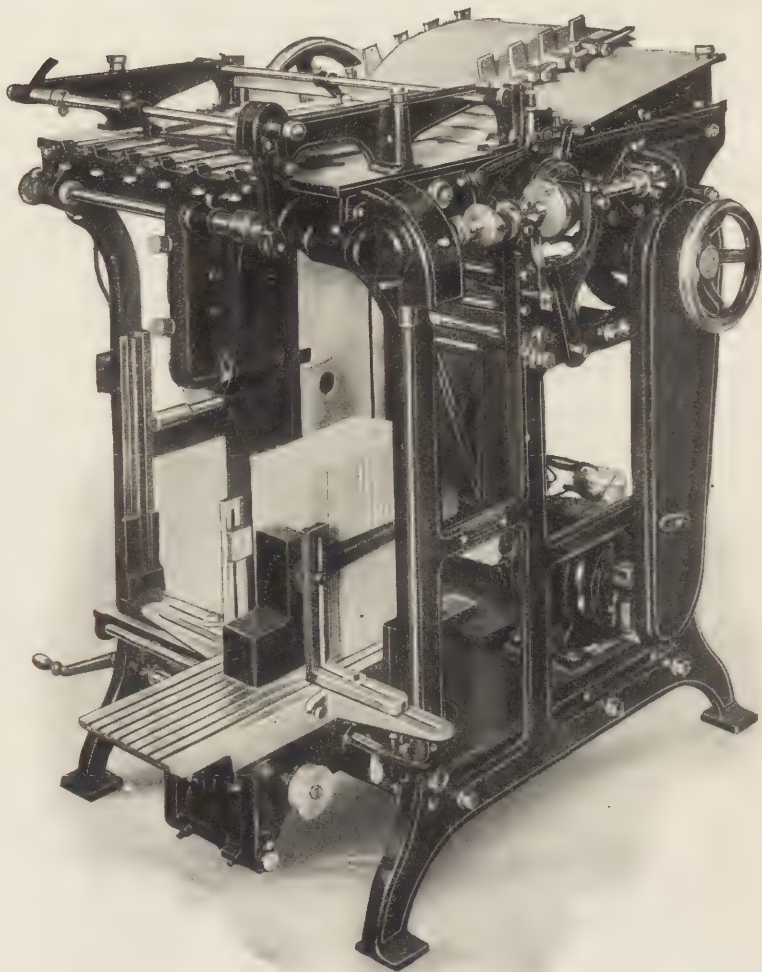
This machine, made by A. W. Hall & Co., Chicago, will fold sheets from 8 by 10 to 34 by 34 or larger if wanted. It will make three parallel, or two parallel and one right angle, or two parallel and two other parallel in right angle to the first two folds. All changes and adjustments can be made while machine is running. Speed average, 4,200 per hour, push-feed.

The quadruple book-folding machines receive a full sheet of four sixteen-page signatures, which may be folded and delivered to the packing boxes as four separate sixteen-page signatures, or one sixteen inserted within the other, making two sections of thirty-two pages. This is a convenient machine for large-edition or publishing houses.



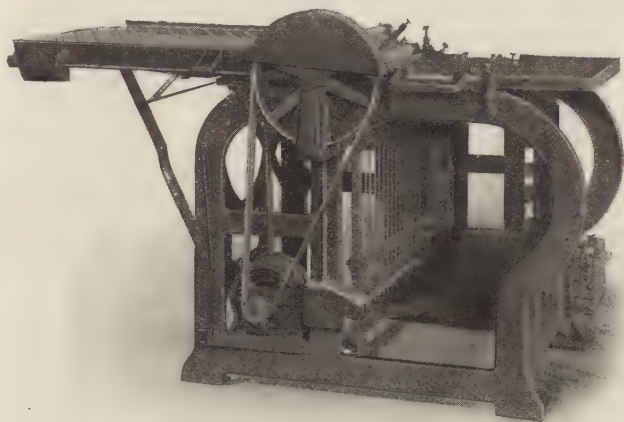
Dexter Quad Parallel Folder.

The tapeless folder is an innovation in folding machine construction, as there are no tapes, knives, or cams. Any weight from onion-skin to the heaviest double-coated book and cover stock may be folded.



Universal Push-feed Circular Folder.

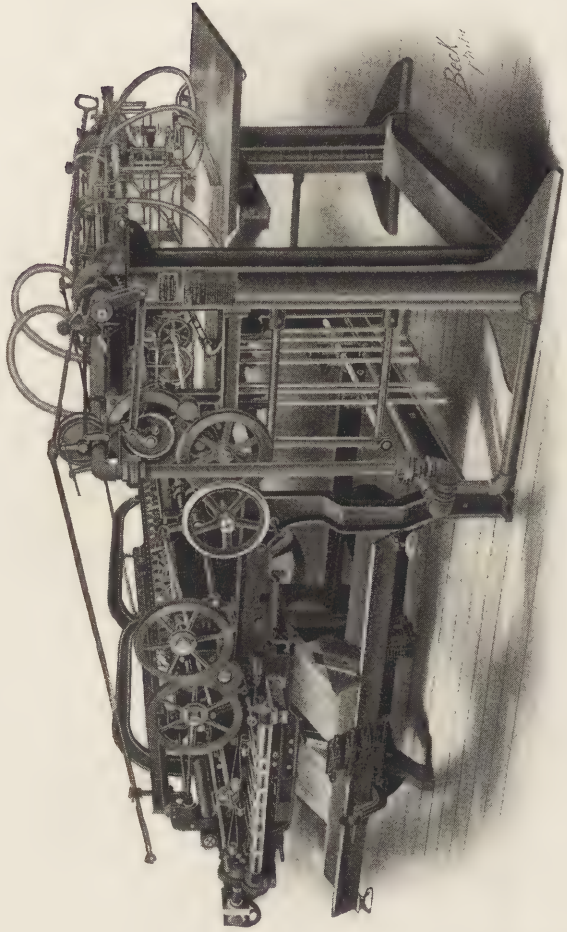
The Model A makes thirty-three parallel and right-angle forms; the Model B will make one hundred and fifty-nine forms in the parallel, right-angle and oblong folds. The parallel folds range in size from 26 by 58 inches to 4 by 7 inches; the right-angle folds from 26 by 40 inches



Cleveland Tapeless Folder.

to 7 by 8 inches, and the oblong folds from 26 by 34 to 7 by 8 inches. Five thousand sheets $6\frac{1}{2}$ by $10\frac{1}{2}$ per hour is the speed record claimed for it.

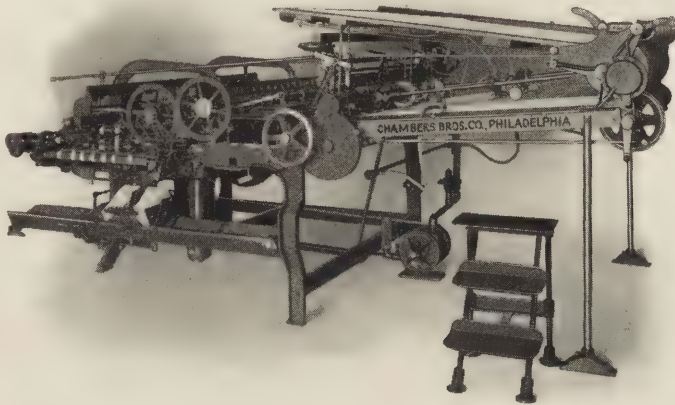
PAPER-FEEDING MACHINES.—There are different types of paper-feeding machines in operation, and claims of superiority are made for all of them. The combing wheel operates from the top of the pile and combs or runs out the sheets until they reach the guide, when the combing wheel is raised off the sheets and a small roller starts them into the machine. It should be adjusted so as to comb on the margin. On thin or soft paper the combing wheel has a tendency to sink into the pile without advancing the sheet.



Chambers Double Sixteen, with King Combining-wheel Pile Feeder.

Another style pile feeder feeds the sheets by means of bucklers and push-fingers. The bucklers are set at both ends, advance the sheets upward and the push-fingers shove them forward under drop rubber rollers, which at regular intervals start the sheets into the machine. Unless accurately adjusted on heavy-coated stock, the bucklers break the paper.

The continuous feeder is operated by combing wheels. As there are but a few sheets beneath the wheel, an accu-

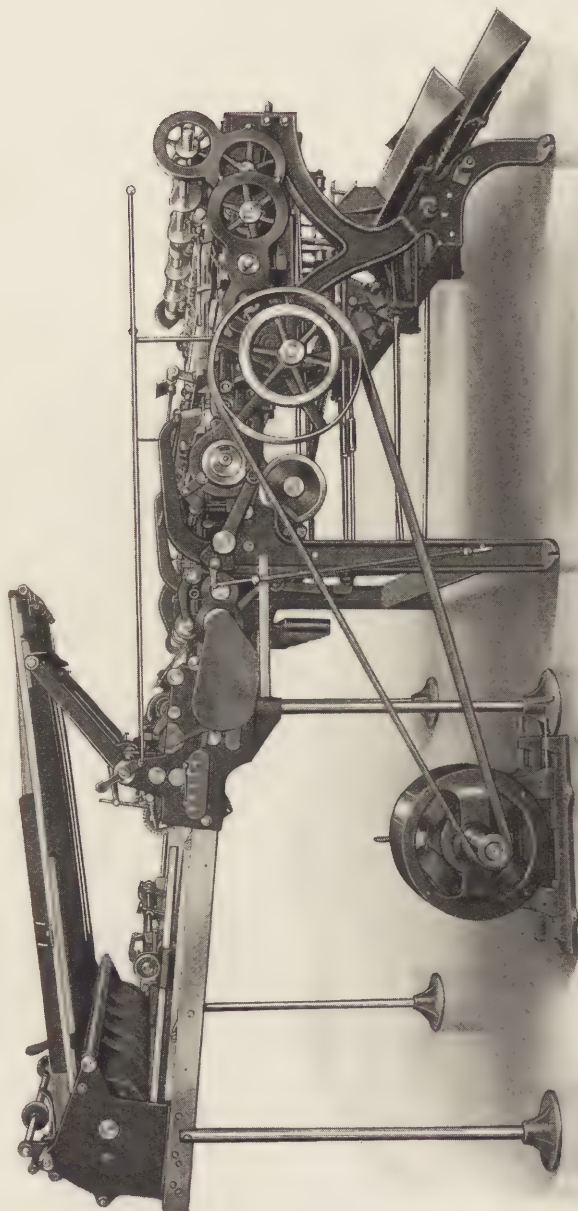


Chambers Double Sixteen Folder and King Continuous Feeder.

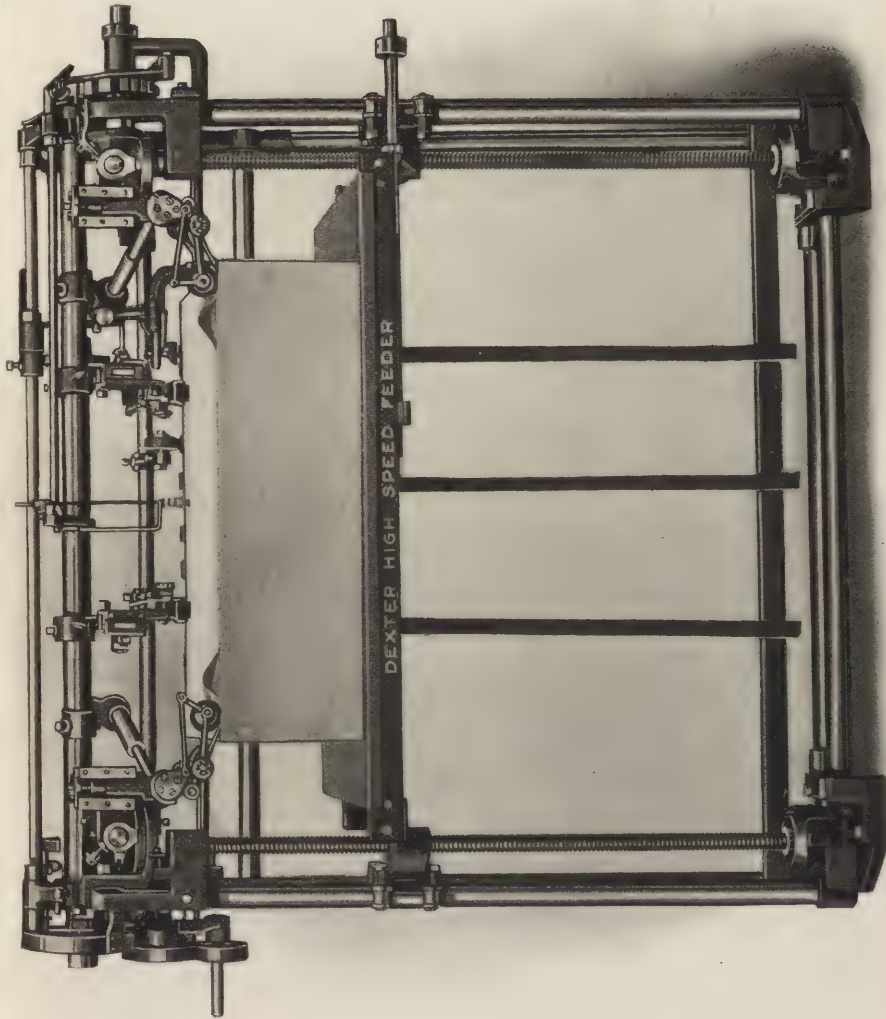
rate feed of thin or spongy stock is assured. The paper is placed on the feed-board while the machine is running, thus saving the piling time.

SHEET-PIILING TRUCKS AND BOARDS FOR PAPER FEEDERS.

The strongest argument in favor of the automatic feeding machine over the hand feed is that it works continuously, and will carry a load of about seven thousand sheets. It dispenses with the frequent stoppages to put up small lifts common when machines are fed by hand. The sheet-piling trucks reduce the necessary stoppages



Dexter Quad Folder and Cross Continuous Feeder.

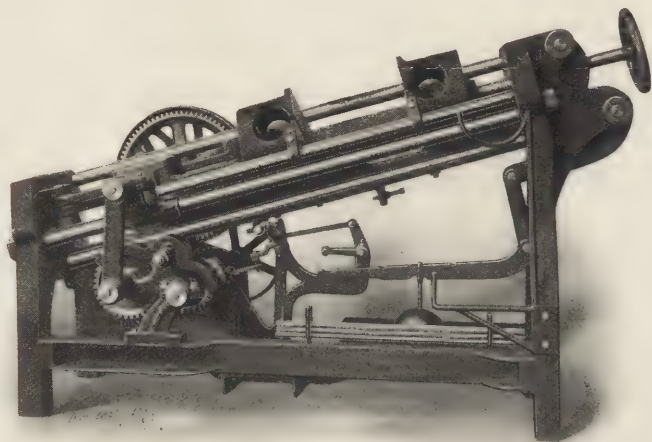


New Style Pile Feeder.

by providing a system of loose piling boards, mounted upon rollers, and on which several thousand sheets can be piled at any convenient place about the room, while the machine is running. The last sheet having been fed from a feeder board, that board is removed, the sheet-piling truck, with its loose board loaded with sheets, is run into position, and the pile of paper immediately rolled from the truck to its position on the feeder and the machine started. From fifteen to twenty minutes' time is thus saved every time the feeder is loaded.

BUNDLING.

Solidity of the paper is the most essential feature of a perfectly bound book. The smashing takes out the impression made by the press. The air is forced from

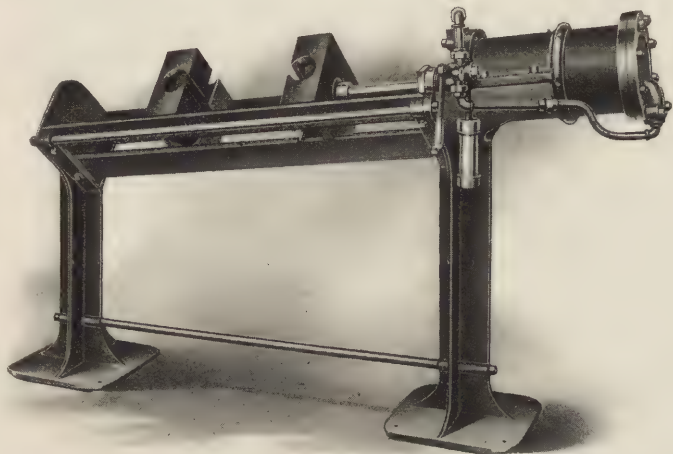


Sheridan Power Bundling Machine.

between the folded sheets, and so allows them to be flat. A book which is not properly smashed will, after the book is trimmed, show starts, and this, too, no matter how accurate the trimming may be. It is impossible to gild a

book if not smashed or thoroughly pressed. In rounding and backing with the machine, uniformity is well nigh impossible. The pressing is a substitute for smashing in small establishments, and should precede the sewing.

The smashing machine is superfluous if the sheets are properly compressed. The signature press shown in the



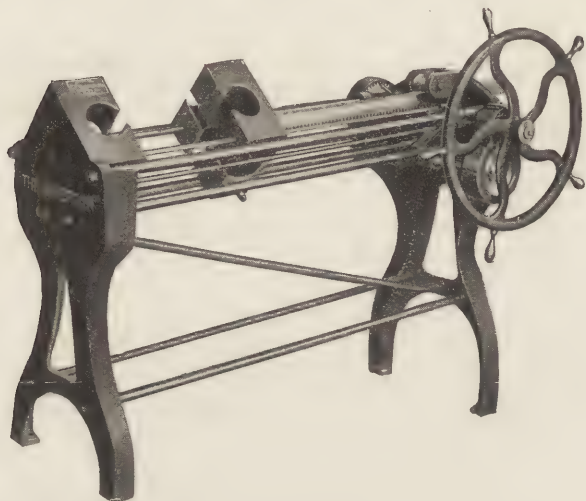
Berry Pneumatic Signature Press.

illustration does the work of dry pressing, smashing, bundling and padding. It eliminates operations and unnecessary machinery. Going from the folder to the gatherer in compact bundles gives the sheets a greater pressure than could be obtained from the moment's pressure in the smasher.

The heads, which can be adjusted to any size pile, are provided with large holes in which the hands can be inserted to tie the bundles. All folded matter should be bundled, because it prevents the loss of sheets, and keeps them clean, aside from the actual necessity above described for the subsequent operations.

There are many different kinds of bundling presses, but their operation is about the same. Place beveled

wooden boards on the ends, and lay the folded signatures between. A cardboard with the work order number, the number of signatures, and the name of the bundler plainly written thereon should be placed on the top board. Close the press by power, wheel or handle and ratchet. Insert a one-half inch manila hemp rope, and tie the bundle with



Hand Bundling Machine with compound cut steel gears.
(C. F. Anderson.)

a slip knot. Remove the bundle, and stack away. It should not be disturbed until the book is ready for gathering.

SLITTING.

Slitting is the process of separating the leaves of folded signatures preparatory to tipping-in or inserting insets. For instance, to do this to a sixteen-page signature, place the knife or sharp folder between pages 4 and 5, and 12 and 13 for the head slit; between 10 and 11, and 14 and 15 for the front slit, and separate the leaves to the back marginal fold. The slitting may be eliminated by a narrow trimming of the front and head. On pam-

phlets or ordinary work, this method is preferable to hand-slitting, as by it considerable time is saved.

In folding heavy stock which has a tendency to buckle, slit the second or head fold before the last fold is made.

INSERTING.

Insets are plates, drawings, maps, or printed tabular sheets, which are to be tipped into or placed between the folded signatures. As far as practicable, to obviate slitting, insets should be arranged to come between or in the center of folded signatures. Maps should be provided for at the end of the text. Plates, maps, and all insets are tipped in to face the page designated by the legend. Plates printed on heavy paper or cardboard should be guarded. All plates which are as large as the open book should be folded in the middle and guarded. Folded signatures which are placed one in another or in a cover are inserted, and hence printed, as insets. The signatures of saddle-stitched pamphlets are inserted in one another and into the cover.

MAPS.

A common method employed on all maps which are longer than the book page is to cut out about three-fourths of an inch of the binding ends of the maps, leaving uncut at the bottom a portion one-half of an inch smaller than the book page; they are then folded and tipped into the book after it is bound. If folded maps exceed one-eighth of an inch in thickness, stubs are provided by cutting strips of paper and gluing them together on the edge. On bound books they are sewed in the place of the map by means of an overcast or whip-stitch. To trim the book, fillers are inserted and the forwarding is done in the usual manner.

Many binders are of the opinion that the bottom left end of the map must be tipped into the book, presumably to enable the book to remain on the desk or table when

the map is opened out. This method on side-stitched pamphlets containing one or two folds for the length necessitates tipping the map in before or after the pamphlets are trimmed.

To save the tipping on all side-stitched pamphlets containing thin maps, cut out the bottom left end of the map



enough to clear the binding space, or about three-fourths of an inch. The distance from the head to the cut is one-fourth of an inch less than the length of the trimmed margin of the book. The first fold is close to the cut-in edge; the second, three-eighths of an inch from the head; and the third, even with the first fold; this is repeated until the entire length of the map is folded. The width is folded three-eighths of an inch inside the front trimmed margin and back to the cut-in edge; this is repeated until the entire width is folded. The map can be gathered or inserted without the danger of trimming the folds, and the unsightly tipping-in of maps in side-stitched pamphlets after the work is completed is eliminated.

A common method on side-stitched pamphlets containing a number of large maps is to trim the text after gathering, and to supply the thickness of the maps with stubs one-half to three-fourths of an inch wide on the binding end. The maps and stubs are put in place and the

book stitched. This, besides being very slow, is hardly in keeping with the progress of the times. There are obsolete signatures in all binderies which can be utilized to good advantage as fillers by perforating them one-half to three-fourths of an inch from the fold and gathering in sufficient number to take up the thickness of the folded map. The books can be sewn on a sewing machine or stitched, and the necessity for fillers to trim and forward is obviously eliminated. After the books are bound, the places provided for the maps are cleared at the perforation, leaving the regulation stub to take up the thickness. The maps are tipped on the stubs at the left end.

A saving of time is thus effected on small maps which can be inserted in side-stitched pamphlets, as well as in sewing, by substituting machine for hand work, and in forwarding by eliminating fillers and handling it as regular work. The edges and stubs present an even appearance, and what was once considered an awkward-looking book is transformed into one which is easy of access and which invites perusal.

GATHERING.

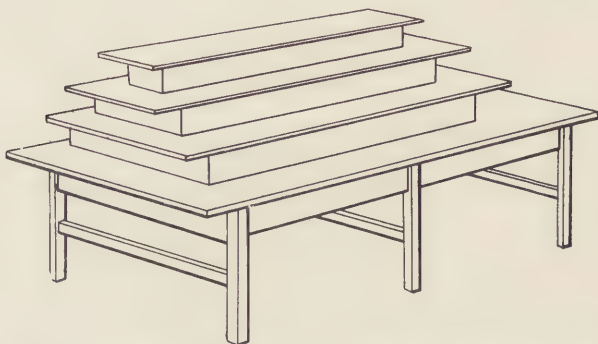
After the signatures are folded and bundled, they are placed on a table in consecutive order. The assembling is done by beginning at the last and finishing at the first signature.

To reduce the table room required in gathering thick books, a gathering table may be made as shown in the illustration. Two books, one on each side, of more than the ordinary number of pages, can be gathered on this table, which will appeal to any bindery which is cramped for room.

The books when gathered are piled on a platform, and, if a four-point rule has been printed in the back marginal fold step fashion, the collating is done at a glance, and the books are ready for sewing.

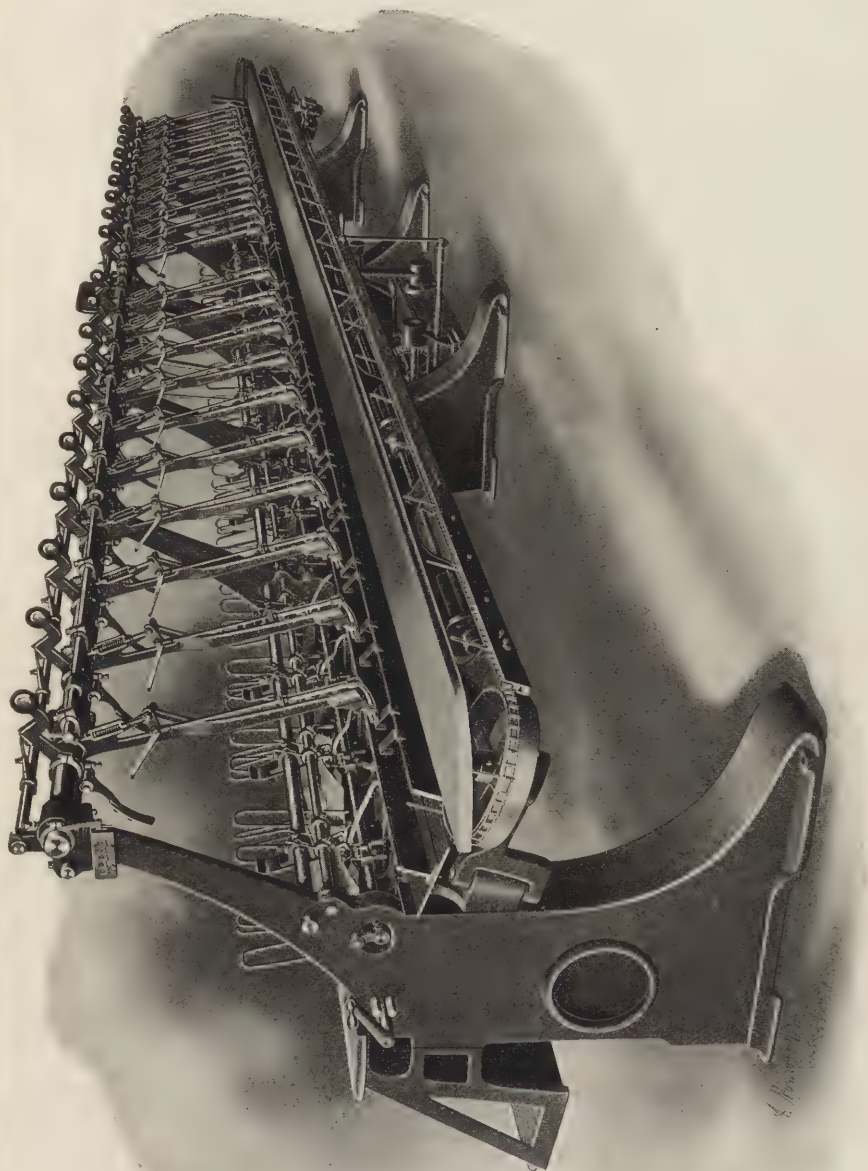
Another method is the large round table driven by power. The signatures are laid on top, and the gatherer

takes a seat so that the signatures can be easily picked up one at a time. A number of gatherers can be seated around the table and an extra person employed to take away the gathered signatures to the collators. The speed can be regulated to suit the requirements of the paper and

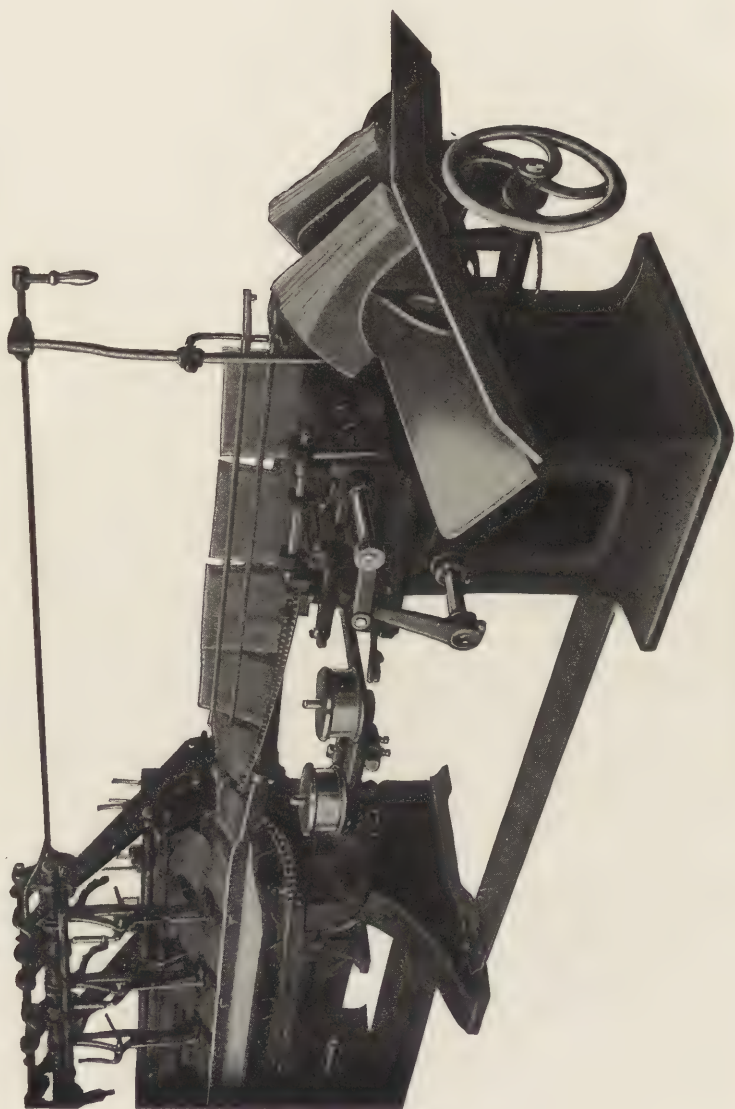


operator. The objection to this is that inexperienced gatherers become dizzy, due to the speed of the table and the constant gaze on the sheets.

GATHERING MACHINE.— These machines can be built with any number of boxes of any size. It requires four operators to run a machine with four boxes, two to place the signatures in the boxes, one to remove the imperfect signatures as the machine stops after detecting them, and one to remove the gathered books. The capacity of the machine at sixty revolutions per minute is from twenty-five hundred to three thousand books per hour. The signatures are placed in the boxes in consecutive order, the suckers come up under the different piles and pull one signature down from each pile, at the same time the gripper jaws enter and grasp the same. Then the small hooks on each side of the gripper pass under the pile, over the grasped signature, and lift the signatures in the box to lessen the friction on the one grasped. When the gripper draws the signatures out and drops them in the conveyor upon the preceding one the chain



The Juenzst Gatherer-Collator-Jogger.

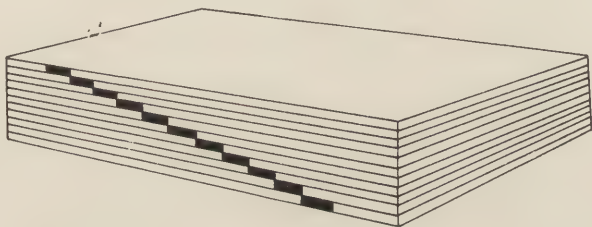


Juengst Gatherer-Collator-Jogger-Stitcher.

moves those in the conveyor under the next gripper, and the above action is repeated until the first sheet passes under each pile and completes a book.

The detecting device is operated by the thickness of the sheets in the signature or by the signature itself. Thus, if there is one or more sheets missing, or one or more sheets too many in the signatures, the small hook shown on each gripper arm will catch either on the upper or the lower edge of the notched plate as the signature is thicker or thinner than it should be, and by so catching will cause the machine to stop. At the same time it causes the lever with the indicating ball on its end to rise at the box where the error is, thus giving the operator a signal where to look for the trouble, to rectify which he will place a proper signature where the imperfect one would have fallen, and after removing the defective one from the gripper, start the machine by pulling down on said ball.

When stitchers are attached to these machines, the conveyor changes the position of the signatures from horizontal to vertical, and then passes them in the stitcher.



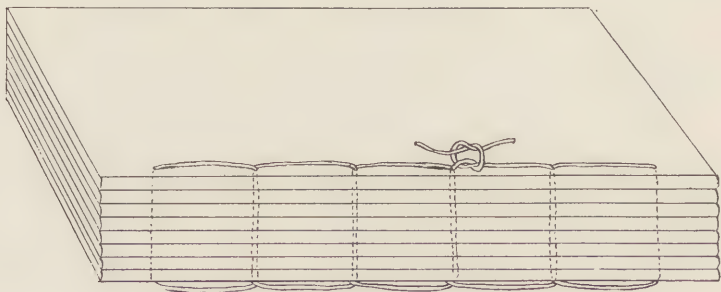
COLLATING.

After the signatures are gathered, they are examined and verified for misplacements. This is done by taking the gathered book in the right hand on the top and front corner, holding up the signatures, and with the thumb of the left hand releasing one signature at a time, observ-

ing the figures at the bottom of the page. If the printer has provided a four-point rule in the marginal fold step fashion, the collating can be eliminated, as misplaced signatures are easily detected by looking at the back. When the sections are gathered, the rule will show as a straight line, running diagonally across the back of the book. Any break in the line can only mean that something is wrong, and all signatures not in their proper places may easily be removed and the correct ones inserted.

THREAD STITCHING.

To saddle-stitch pamphlets with thread, put the needle through the center in the fold, pull it through, and leave about two inches of thread to tie the knot. Then put the needle through the fold from without near the bottom line of printing, and bring it through to the top line; then again, as at first, put the needle through the fold from within, and pull the thread through. The needle is then put in the center in the same hole through which the thread passed from within, and the thread pulled through. The thread is placed between the two ends and a double knot tied.



Side-thread stitching is done in the same manner, except that the holes are stabbed with an awl where the needle enters, and the thread is inserted from the bottom side.

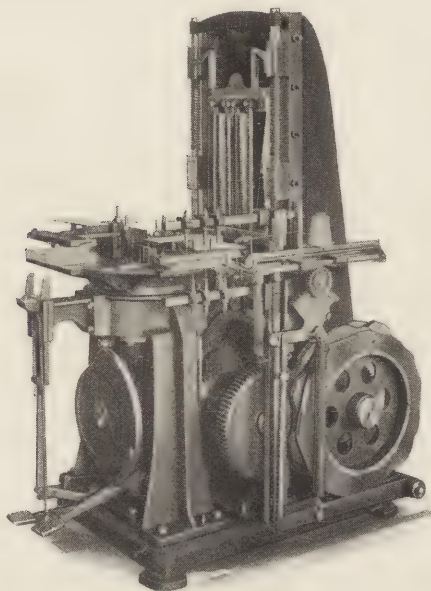
On thick books better results are obtained by punching the sheets close to the edge of the fold and substituting soft twine for thread. This is sometimes substituted for whip-stitching on open or close joint letterpress books, in which case the holes must be about two inches apart. For tight-joint books take a strip of muslin two inches wide, and paste one-half of an inch on the end-leaves of the book over the punching, and sew the end-papers on the outer leaves close to the punching. Fray out the soft twine, and insert in a large sailmaker's needle. Place the book in front with the head to the left, then from the back insert the needle in the center hole, pull it through, insert in the hole to the right, pull it through, and insert the needle in the second hole to the right. This is continued until the soft twine is in each hole to the right of the center hole to the tail. Insert the needle from the hole near the tail edge into the one to the left, and repeat until the hole next to the center is reached, then carry the thread to the first hole left from the center, pull it through, and repeat for each hole to the left until the head is reached. Insert the needle into the first hole from the hole closest to the head on the right, and repeat for each hole until the center hole is reached, then place the twine which crosses the center hole between the twine ends, and tie two knots.

The objection to this method is that the book can not be rounded because of the solidity of the stitch; this can, to some extent, be obviated by not pulling the soft twine too tight. The book can be forwarded in the regular manner.

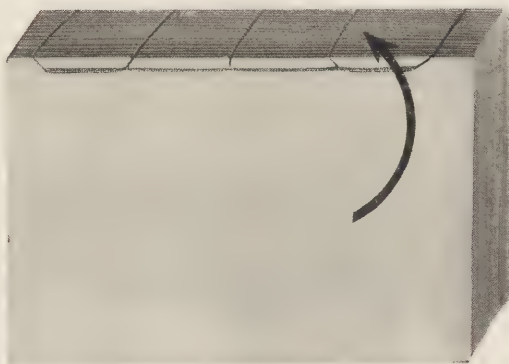
BACK BOOK SEWING MACHINE.—This machine will sew books through the side from one-fourth to two inches in thickness, from five to eleven inches in length and up to nine inches in width. The capacity of the machine is from four to six books per minute regardless of the number of signatures to the book. The adjustments are very

simple and require no expert operator. This method of sewing is largely used on school books.

INSERTING AND WINDING WITH TWINE can be done by hand, as illustrated below, on sheets which are seldom referred to and only bound to be used in case of emer-



Samson Back Book Sewing Machine.



Sample of work from Samson machine.

gency and which are invariably too thick for stitching. The character of the work does not warrant whip-stitching, so the sheets are glued together and sawed slantwise, the cut being the diagonal of one-half inch square. The saw incisions are filled with glue and soft six-ply twine

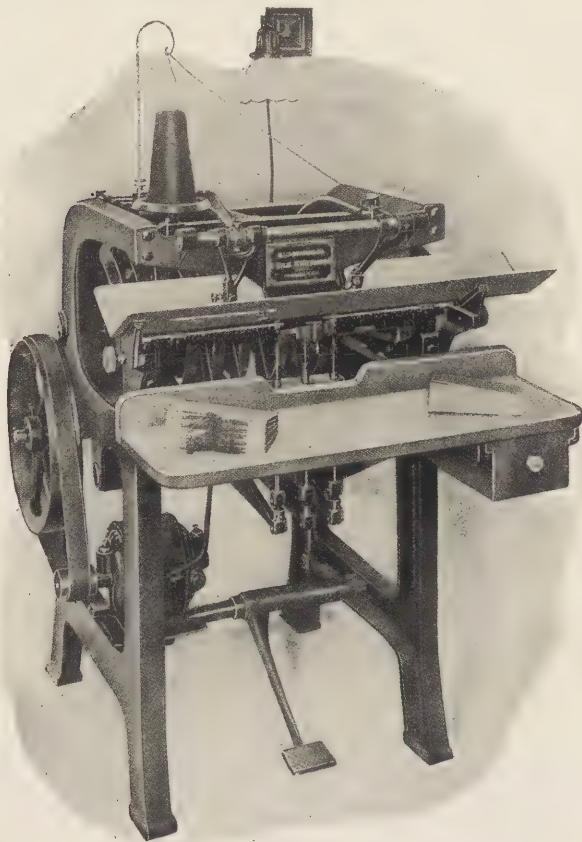


Boston No. 2 Wire Stitcher.
(American Type Founders.)

inserted. The back is then covered with glue and the ends of the twine cut to allow one inch to be tipped on the

end-leaves to which a strip of drab-drilling has been pasted to reinforce the joint. This method is adopted on newspapers bound for files.

Another method is to wind thread or twine from one saw incision to the other, tie a knot, and put the ends into the incision, then cover the back with glue. When dry, proceed with the binding.

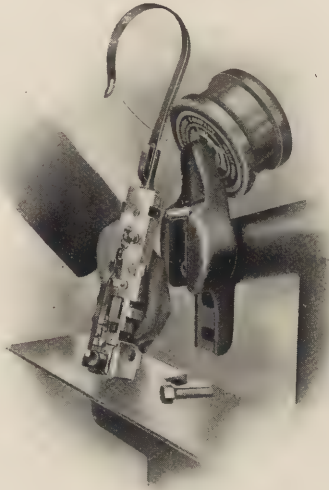


ROBERTS SILK-STITCHING MACHINE.—This machine has been designed to double-stitch pamphlets with silk floss, mercerized cotton, or thread with a knot in the cen-

ter. It will stitch uniformly without waste of cord. The machine is simple and is readily adjusted to various thicknesses. It will stitch about two thousand booklets per hour.

WIRE STITCHING.

There is no method of stitching with thread which in firmness compares with wire stapling. For this purpose

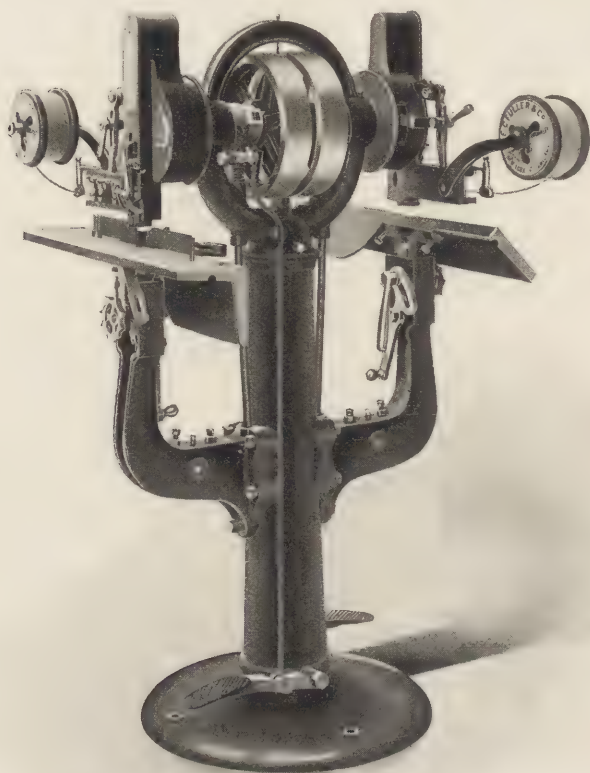


Boston No. 2 and No. 9 Head.

there are a number of machines on the market, and for each there is a claim of superiority on some special work. From two sheets to two inches in thickness can be stitched, but a machine capable of stitching the maximum can not stitch the minimum. A machine capable of stitching two sheets will rarely stitch seven-eighths of an inch. There are seldom more than three changes in setting the machine from one thickness to another; namely, the distance for the table, the wire feed, and the staple size. Some machines have two tables — one for saddle, the other for side, stitching. There are two kinds of

feeding devices — the straight friction, and the roll feed; of these, the latter is preferable, because it distributes the wear evenly. These adjustments are simple.

Three kinds of wire are manufactured; namely, steel, zinc-coated and brass. The former is commonly used, but

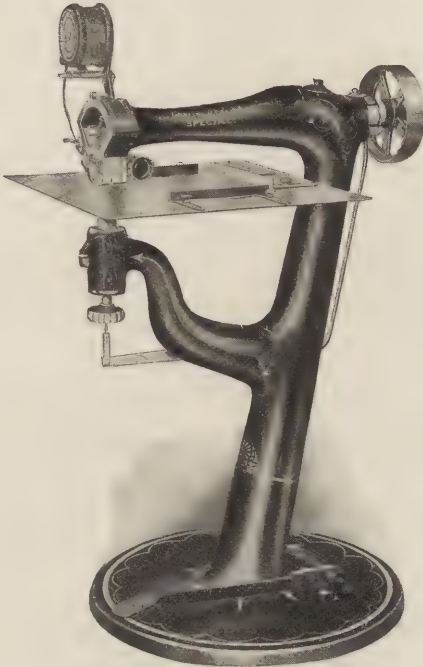


Universal.
(E. C. Fuller.)

because of its corroding susceptibilities, zinc-coated and brass are preferable. The coated wire will not rust so long as the zinc coating remains, but it can not be guar-

anteed. The brass is excellent and should be used on all books exported to the tropics and in climates which have a rainy season.

To facilitate adjusting the machine, the following



Latham Special Calendar Stitcher.

scale will suffice for ordinary book paper. It will be necessary to deviate somewhat for bond and ledger paper:

- From 2 to 6 sheets.....No. 30 or 28 wire.
- From 6 sheets to 3-16 inch.No. 28 or 25 wire.
- From 3-16 inch to $\frac{3}{8}$ inch..No. 24 or 21 $\frac{1}{2}$ by 25
wire.
- From $\frac{3}{8}$ inch to $\frac{1}{2}$ inch...No. 20 by 25 wire.
- From $\frac{1}{2}$ inch to $\frac{3}{4}$ inch...No. 20 by 23 wire.
- From $\frac{3}{4}$ inch to 1 $\frac{1}{2}$ inches.No. 18 by 20 wire.



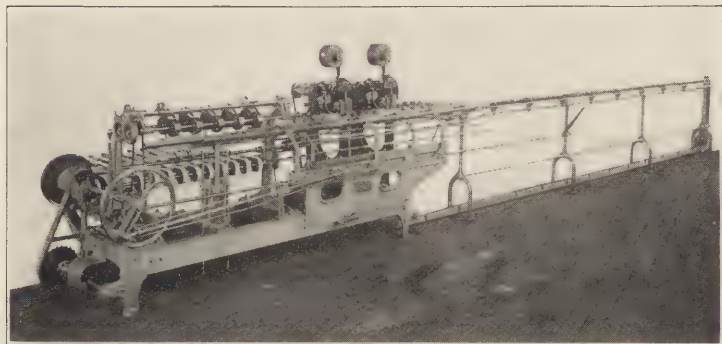
Boston No. 9 Multiple Stitcher.
(American Type Founders.)

Adjust the parts to correspond with the thickness required to be stitched. The feeder must be adjusted to deliver the wire straight to the staple former. The tube should be so close to the cutting blade that the wire when cut leaves little or no burr. If, for any reason, the shanks of the staples are not uniform, the feeder or former needs attention. The staple must be large enough to provide clinching space on the ends. The staple former should be kept free from wire cuttings. Stitching machines which are constantly in use should be overhauled and new parts supplied.

When stitching saddle pamphlets, a greater speed can be attained by having a feeder and an operator. This gives the maximum speed and produces three times the results of an individual operator. In stitching two or more on (which, when the binding is completed, are cut apart), take a piece of pulpboard and draw a line where the books are to be cut apart; lay this on the sheets as a guide, and stitch. The stitching should be at least one-half inch from the trim margins to prevent any damage being done in cutting apart. All thick side-stitch books should have ample binding margin from one to one and one-half inches to permit opening in the center.

The Multiple stitcher will stitch up to ten stitches at one stroke. It is designed for books or pamphlets of which there are great numbers of one size. It will work with one or more heads up to its limits; the distance between the stitches is adjustable, the largest space between the two outer staples being twenty-two inches, and the smallest space between two stitches being one inch. This machine will stitch either through the side up to one-quarter of an inch or through the fold. It is provided with a convertible table or saddle. All adjustments are instantaneous, requiring no tools. Each wire head is self-contained and can be taken off the frame by the turn of a catch.

AUTOMATIC STITCHER FEEDER.—This machine is designed to feed automatically wire stitchers on all of saddle-back stitching and can be attached to any ordinary wire stitchers. It will feed single books or in gangs, and jog up the inserts and cover before stitching. The girls place the inserted book directly onto the long saddle at

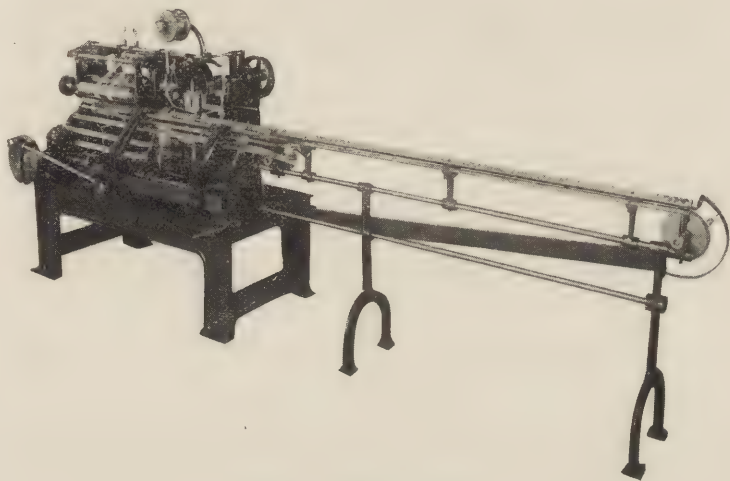


Christenson Automatic Stitcher Feeder.

the time the inserting is done. The long saddle has an endless conveyor chain with equally distant projections on it; the book is placed in one of the spaces on the chain, then the chain conveys the book over to the stitcher feeder proper. Here the feeder takes the book from the chain and handles the book automatically while the staples are placed. After the book is completely stitched, it is removed from the saddle mechanically and placed in a heavy overlapping layer on slow-moving tapes, making it convenient for the girl to remove the finished product.

As the machine is fed automatically, the services of the stitcher feeder and operator are dispensed with entirely, and the stitchers require no watching or attention aside from the girl removing the product, and the inserters. On the average work, two stitchers are used, but on work requiring an odd number of staples, three stitchers can be used. The number of girls required to

operate the machine varies with the nature and class of work. The machine can be easily changed from one size to another, and on many kinds of work it is not necessary to reset the machine. On pamphlet work the machine will head up one or two insets and cover if they are closed head insets, or one inset and cover if open head work. This applies when the girl handles all the insets and cover. But when three or four insets are used, they must be placed on the conveyor of the machine one at a time, so that the book is built up, headed up. The speed of the machine varies according to the size and condition of work; when using two stitchers it varies from two

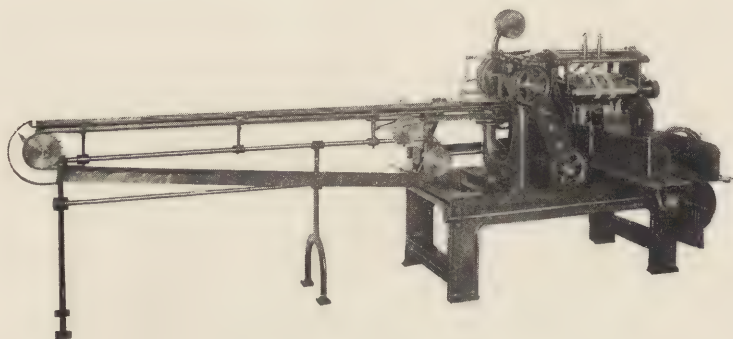


Moyer Continuous Stitcheer.
Front view.

hundred to two hundred and eighty staples per minute. The daily average in a nine-hour day varies from fifty thousand to sixty thousand pamphlets with two or three staples. The staples can be placed in almost any position in the book, and the staples never get into the margins to spoil the trimmer knives.

The machine can, at the time the pamphlet is stapled, without any labor cost, place a wire hanger loop in each pamphlet. A counter, attachable to the machine, makes every twenty-fifth book project out at the end of the pack, so that books can be removed easily in packs.

The Moyer automatic pamphlet stitcher has a medium average capacity of 70 books per minute with two staples, or 100 books when run two-up. It requires no experienced



Moyer Continuous Stitcher.
Rear view.

operators; the two girls attending it can change about on the saddle or packing box. The range of sizes that can be handled are from 6 to 16 inches in length and 3 to 11 inches in width. Thickness, 8 pages to $\frac{1}{4}$ inch; wire, 25 to 30; floor space occupied, 4 by 11 feet.

WIRE STAPLE TABLE.

To ascertain the number of staples in one pound of wire, measure the full length of the staple; in the first column of the following table you will find the corresponding size; pass to the right column of the same number as the wire. For example, if the staple measures $1\frac{1}{2}$ inches and No. 28 wire was used, there are 11,940 staples in one pound, as shown in the table.

Length of Wire in Staple.	18	19	20	21	23	25	28
$\frac{1}{8}$ inch.....	4,104	5,394	7,408	8,856	14,544	22,640	35,820
$\frac{1}{4}$ inch.....	3,283	4,315	5,926	7,084	11,635	18,112	28,656
$\frac{3}{8}$ inch.....	2,736	3,596	4,938	5,904	9,696	15,093	23,880
$\frac{1}{2}$ inch.....	2,345	3,082	4,233	5,060	8,310	12,937	20,468
$\frac{5}{8}$ inch.....	2,052	2,697	3,704	4,228	7,272	11,320	17,910
$\frac{3}{4}$ inch.....	1,824	2,397	3,292	3,936	6,464	10,062	15,920
$\frac{7}{8}$ inch.....	1,641	2,157	2,963	3,542	5,817	9,056	14,328
1 inch.....	1,492	1,961	2,693	3,220	5,288	8,232	13,025
$1\frac{1}{8}$ inches.....	1,368	1,798	2,469	2,952	4,848	7,546	11,940
$1\frac{1}{4}$ inches.....	1,262	1,659	2,279	2,724	4,475	6,966	11,021
$1\frac{1}{2}$ inches.....	1,172	1,541	2,116	2,530	4,155	6,468	10,234
$1\frac{3}{4}$ inches.....	1,094	1,438	1,975	2,361	3,878	6,037	9,552
2 inches.....	1,026	1,348	1,852	2,214	3,636	5,660	8,955
$2\frac{1}{8}$ inches.....	965	1,269	1,743	2,083	3,422	5,327	8,428
$2\frac{1}{4}$ inches.....	912	1,198	1,646	1,968	3,232	5,031	7,960
$2\frac{1}{2}$ inches.....	864	1,135	1,559	1,864	3,061	4,766	7,541
$2\frac{3}{4}$ inches.....	820	1,078	1,481	1,771	2,908	4,528	7,164
$3\frac{1}{8}$ inches.....	781	1,027	1,411	1,686	2,770	4,312	6,822
$3\frac{1}{4}$ inches.....	746	980	1,346	1,610	2,644	4,116	6,512
$3\frac{1}{2}$ inches.....	713	938	1,288	1,540	2,529	3,937	6,229
$3\frac{3}{4}$ inches.....	684	899	1,234	1,476	2,424	3,773	5,970
4 inches.....	656	863	1,185	1,416	2,327	3,622	5,731
$4\frac{1}{8}$ inches.....	631	829	1,139	1,362	2,237	3,483	5,510
$4\frac{1}{4}$ inches.....	608	799	1,097	1,312	2,154	3,354	5,306
$4\frac{1}{2}$ inches.....	586	770	1,058	1,265	2,077	3,234	5,117
No. of ft. in 1 lb.	171	$224\frac{1}{4}$	$308\frac{3}{8}$	369	606	$943\frac{1}{3}$	$1,492\frac{1}{2}$

PAPER COVERING.

All side-stitched pamphlets should have a paper cover to cover the sides and back. The printed margins of the cover and book should be identical. Printers should put a two-point rule one-eighth of an inch from the top in all cover forms. If there is no printing on the inside of the cover, the pressroom should put sufficient impression on it to be visible as a guide in covering. This eliminates folding before covering, and assures uniformity of margins. In the absence of the marker, the covers can be folded, scored, or incision made with a knife. Ten or twenty pamphlets are put in a pile, slanted, and pasted with a thick paste. (Glue and paste mixed, or flexible or bench fish glue can be used with satisfactory results.) They are then straightened to get a portion of the paste

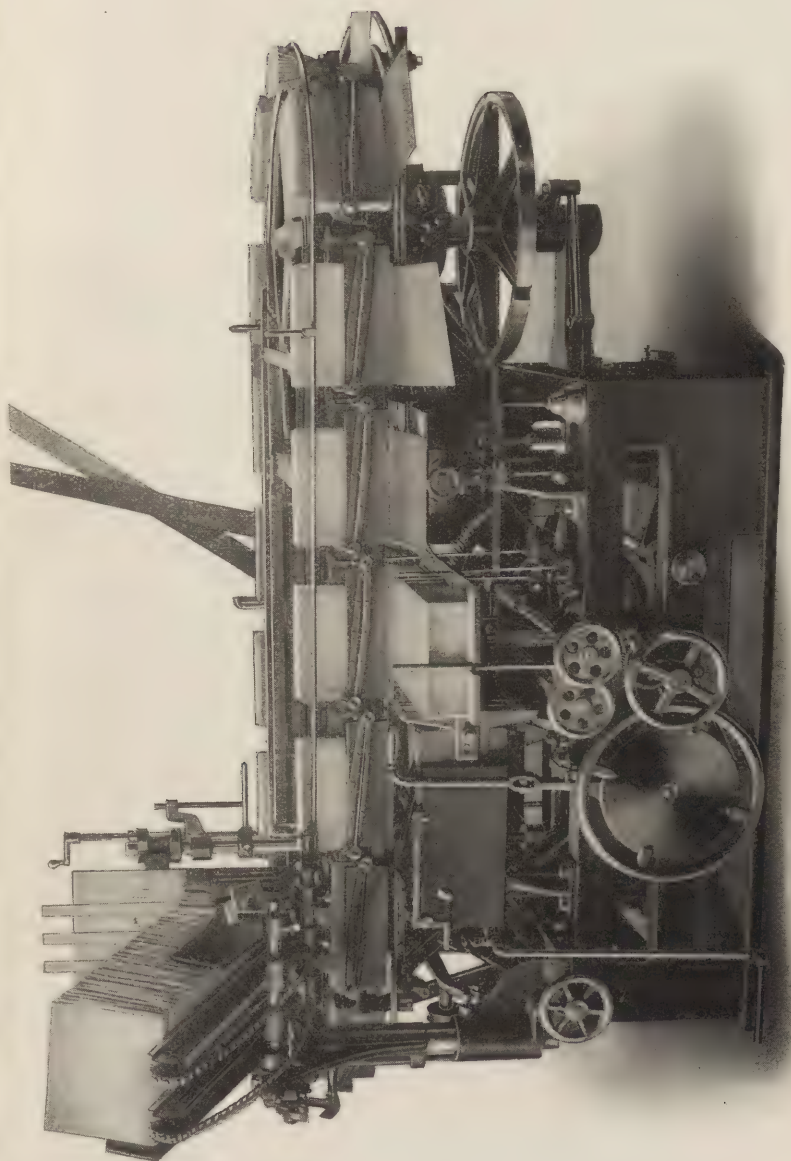
on the opposite sides. The object of this is to cover a portion of the wire stitches. On thin pamphlets this is obligatory, as the back is hardly thick enough to hold the cover. The cover is laid in front of the operator with the front facing the table. The books are taken one at a time and laid on the paper cover even at the head and to the marker. The back half of the cover is brought over with the left hand, while the right holds the book firmly in place. The right hand is released, and the left holds the cover in place, while with the thumb and index finger of the right hand the cover is rubbed down. The book is then laid aside with the left hand, and the operation continued until the pile is covered. The books are then firmly jogged between two boards; with the left hand on top of the pile and with a folder held in the right hand the backs are carefully rubbed down. Then the books are stacked, with the backs out, in convenient lots on a platform ready for trimming.

Heavy cover paper must be scored about one-quarter on an inch from the binding edge to permit opening without forcing the cover from the back.

MARGINAL COVERS.—Sewed pamphlets usually have end-papers tipped on the outer sections and are trimmed before covering. The cover is cut large enough to provide an eighth of an inch square on the fore edge, head and tail.

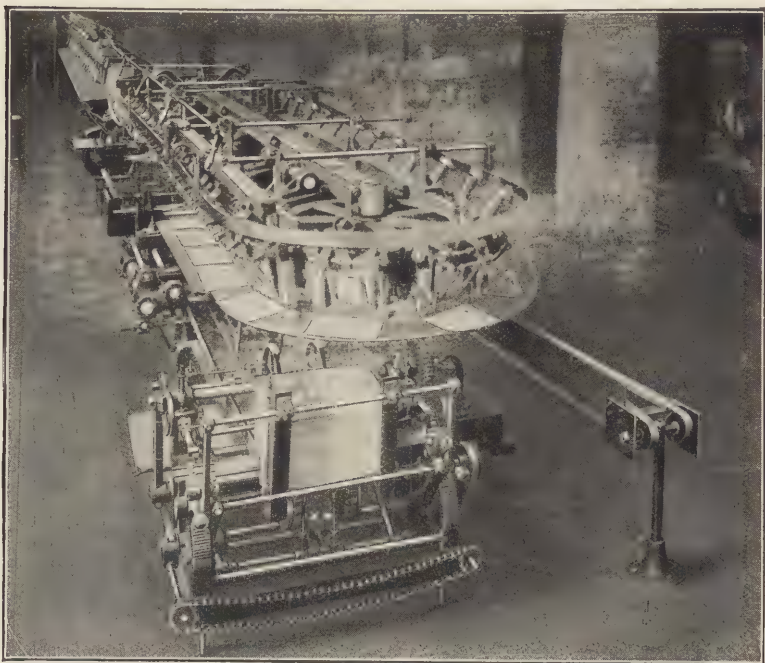
The books are stacked up in convenient lots, the backs glued, and then repiled with the backs and fronts alternating, backs out. When dry they are stacked again, the backs glued or pasted, and the book centered on the cover page and covered; the operation is the same as above described. The first gluing of the backs can be eliminated if care is taken in covering and the book jogged before laying on the cover. The end-leaves are then glued, and the books pressed in convenient lots with the backs out.

Care must be taken in the selection and cutting of cover and end papers, as warped covers frequently result



Sheridan Covering Machine, capacity 40 books per minute.

when the cover paper is cut against the grain, or when end leaves are pasted and the paper permitted to stretch. Ordinary glue should not be used, as it dries hard and becomes brittle. Flour paste will stretch the end-leaves unless great care is taken. A satisfactory adhesive material known as "bench glue" can be procured. This

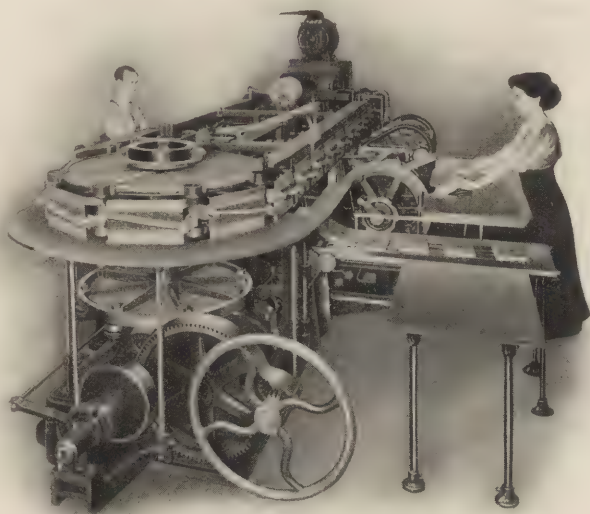


Juengst Gatherer-Stitcher-Covering Machine, capacity 3,000 books per hour.

should not be heated, and, if spread on thin and lightly, will give satisfaction. Warped or wrinkled covers can be avoided by cutting the end-papers against the grain and the covers with the grain. The failure of paper covers to lie flat can sometimes be attributed to using a hard and soft paper together. If hard paper is used for the cover, it should be used for end sheets as well. In pasting

or gluing the end-leaves, the books are nipped in the press, taken out, and a drier, consisting of a thin pulp or straw-board, put between the end-papers, then put back in press, and left over night.

COVERING MACHINE.—This machine is designed to cover side-stitched pamphlets. The covers and books are



Sheridan Perfect Binder. Capacity 34 books per minute.

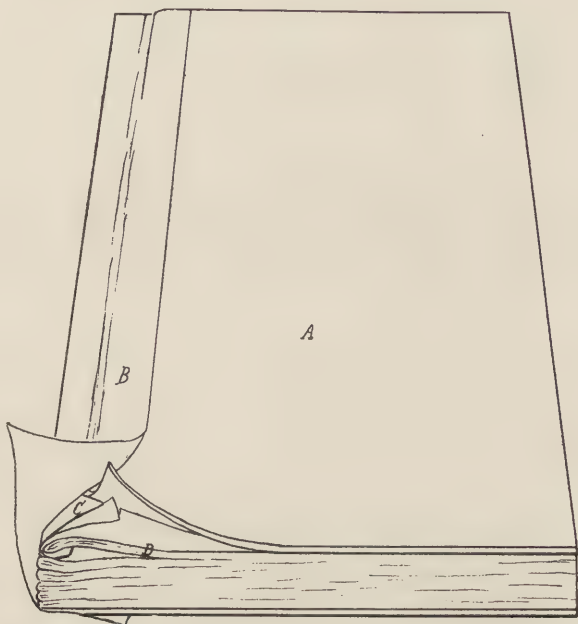
fed automatically. If, for any reason, the cover does not arrive at its proper place to be attached to the book, that book is left unglued. This may happen when the supply of covers has run out, or when there are defective covers, etc. The delivery is on the opposite side of the machine from the gluing mechanism, and can be arranged to deliver in packs from six to ten books. This machine can be attached to a stitching and gathering machine, making a three-machine combination, with a capacity of from twenty-five hundred to three thousand books per hour.

Another covering machine, known as "the perfect binder," finds favor in magazine publishing houses. It will cover gathered signatures with plates, and produce a flat-opening book; thus the objection to wire stitching is overcome. This machine has thirty clamps, which travel around the machine in a vertical position. Three magazines are fed into these clamps as they approach the operator seated at the machine; they are gripped, and conveyed to a knife, working horizontally, which cuts off the edges of the fold. They then pass over a series of small circular saws, which roughen the edges. The adhesive is applied to the back by two rollers, which revolve in a tank, and the magazine picks up from a moving table a piece of super, previously cut a trifle wider than the width of the back, which is fed on the table by a second operator. The magazine then passes over a pile of covers, and picks up one, which sticks to the adhesive on the super. The third or machine operator watches this operation. The magazine travels over mechanism which punches and pinches the back thrice before it is delivered on a table, from which it is removed. These machines average from fourteen hundred to two thousand magazines per hour, according to the character of work.

CARD OR TAG BOARD, CLOTH BACK.

Pamphlets, catalogues or small account books, such as pass or time books, require a more substantial binding than the ordinary paper cover. For saddle-stitch books the card or tag board is cut the size of the two pages when opened plus the thickness of the book. The grain of the board should run the length of the book. If this can not be cut advantageously and it is imperative because of the cost to cut against the grain, then the board must be scored to permit folding. To reinforce the fold, cut a strip of muslin from one-half to three-fourths of an inch wide and the length of the book. Apply a medium thick

paste on a wooden board, lay the strips of muslin (as many as can be finished before the paste dries) on the pasted board. Place a sheet of waste paper on top and rub down. Remove the paper, lift off a strip, lay it in the center on the inside of the folded cover, and stand the



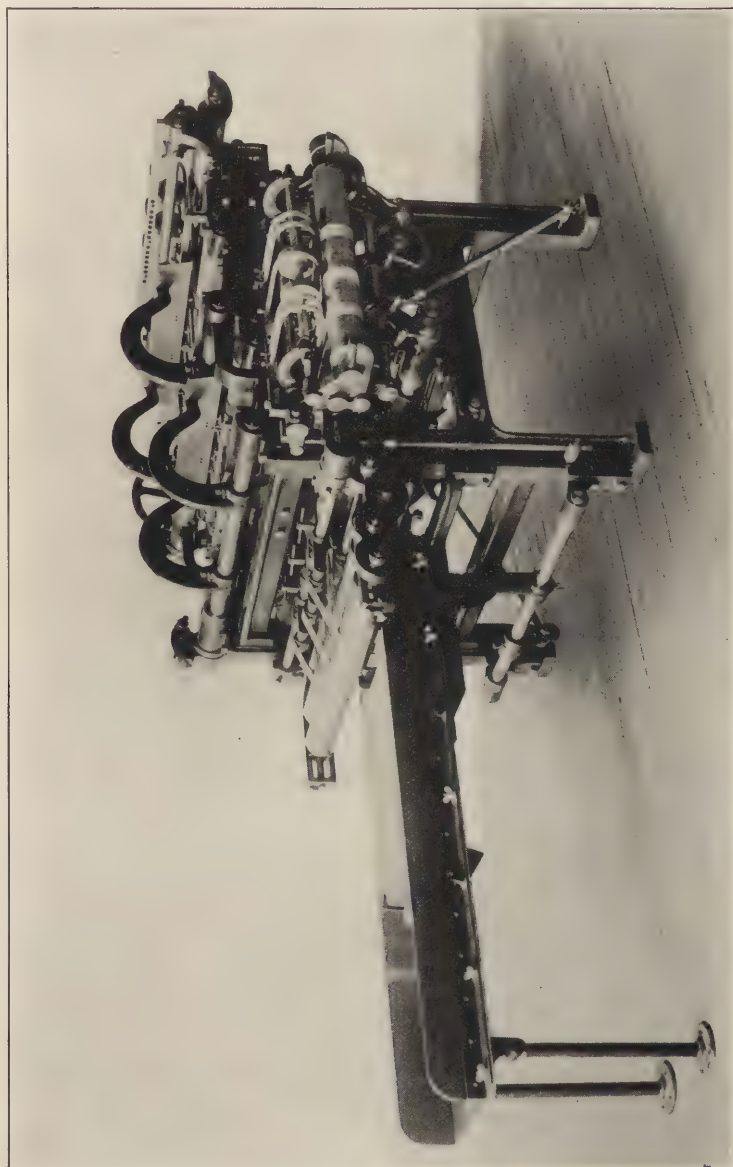
A — Cardboard. B — Cloth back. C — Cloth joint. D — Outer signature.

cardboard on edge to dry. The score should be on the outside whenever the card or tag board is cut against the grain. When dry, fold the covers with the muslin in the center, insert the folded sheets and staple, or sew on a sewing machine. Compress the books or bundle them up over night; this is not necessary on thin books but must be done on all thick books. Then cut a strip of cloth from one-half to three-fourths of an inch wide, according to the thickness and the length of the book. Paste this in the same manner as above described, and lay one-half of

it on one side of the book, turn it over, place it on a piece of paper, bring the paper over, and rub it down. Lay the book aside, repeat the operations, and pile up the books with front and backs alternating, backs out. When dry, the books can be trimmed.

On thick books, saddle-stitching is impracticable, and the pages are made up into consecutive signatures; on such, the card or tag board should be guarded to the outer signatures. Cut the board one-fourth of an inch narrower than the width and the length of the book. A strip of cloth is cut seven-eighths of an inch wide and the length of the book. Fan out the boards on the inside one-half of an inch, apply a medium-thick paste, and lay the cloth on the pasted board so as to leave three-eighths of an inch for the joint. Repeat the operation, and lay aside. When dry, fan out the board so as to paste one-eighth of an inch of the cloth. Take a board and lay it on a piece of paper, take up the outer signature, lay it on the board so as to leave one-eighth of an inch of the cloth to be turned in over the fold of the signature. Bring the piece of paper over tight to the folded edge of the signature, and rub down. When dry, the signatures are gathered, sewed, and the book compressed. Cut the book cloth for the back one and one-half inches plus the width of the back. Jog as many books as can be held by the hands, lay them on the edge of the table with a scrap piece of board on the top and bottom, and apply a medium-thick flexible glue. Separate the books, pile them up, alternating fronts and backs with the backs out. Paste the cloth as described in the preceding chapter, and lay it on about three-fourths of an inch from the edge of the back; place the book with the cloth on a piece of paper, bring it over snug to the back, and rub down. Lay the books aside, and when dry they can be trimmed.

If a cheaper book is desired, the operation is the same as described under quarter-bound, cut flush, marble jute-



Mail-wrapping Machine.
(C. F. Anderson, Chicago.)

board, except that card or tag board is substituted for marble juteboard.

MAIL-WRAPPING MACHINE.

The machine feeds in the book or periodical and puts in two folds. It also feeds in a wrapper, pastes and wraps it around the book at the rate of 7,200 per hour. Special folds can also be made on railroad folders.

PILING-TRUCK.—The most useful appliance for handling paper is the truck for transportation and storage. There are several makes of truck upon the market, but all work upon the same principle. The truck is built close to the floor, and has roller bearings to make movement easy. In connections are platforms or "skids" upon which stock is piled. The truck may be pushed under the platform, fastened thereto, and the whole may then be pushed to any desired position. Time and the labor of repiling are thus saved, and storage is made a simple matter, rearrangement being thus made a minor consideration.

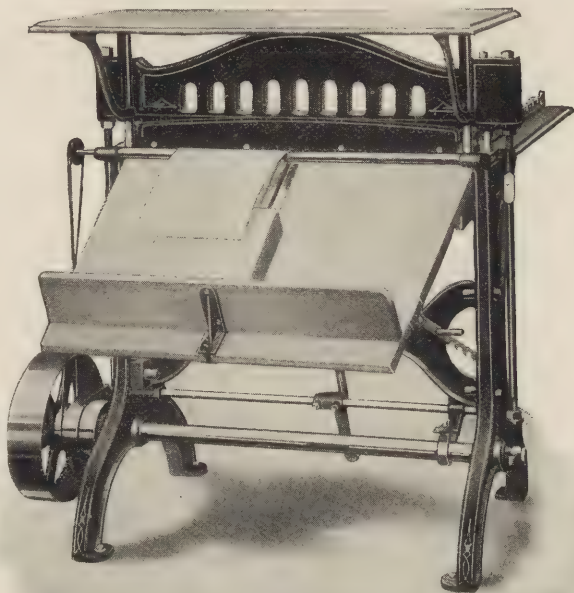


Barrett Multi-Truck, Barrett-Cravens Co., Chicago.

MANIFOLD WORK

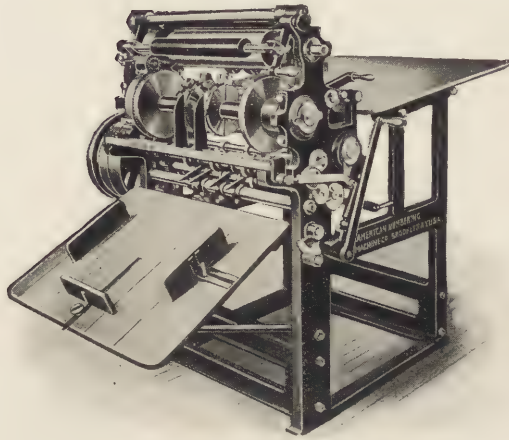
PERFORATING.

There are three kinds of perforation on the market; namely, round hole, slot, and slit. The round and slot perforations have a rough edge, while the slit perforations cut the paper and produce a clean edge. The prefer-

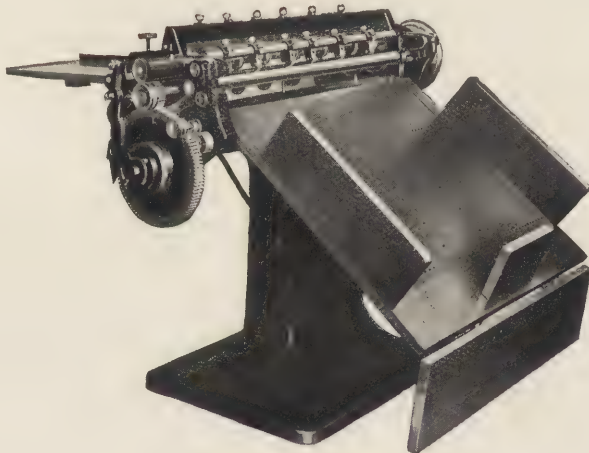


Tatum Round-hole Perforating Machine.

ence is largely a matter of personal taste. For all-around work and convenience in handling the stock, the slit is preferable because of the absence of the burr. The machines for this work do not require an expert operator,

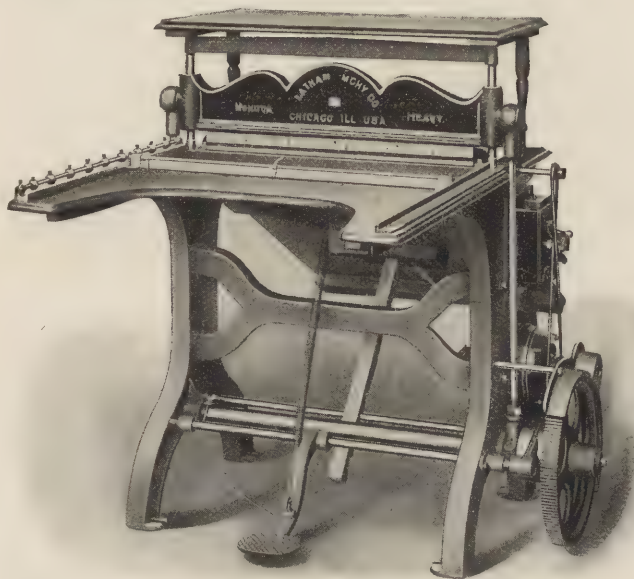


Rotary Perforating and Numbering Press.
One to one hundred numbers at each impression. Will do the work of six
paging machines on long-run jobs.
(American Numbering Machine Company.)



Peerless Slit Rotary Perforator.
(A. S. Burton's Son.)

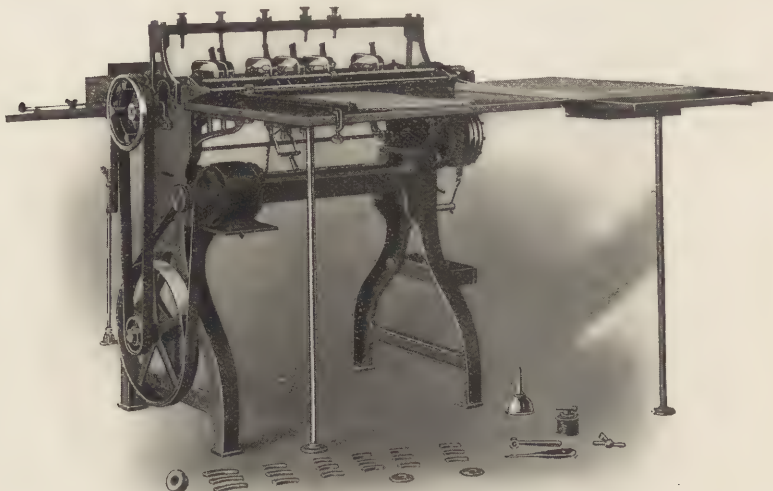
and are easily adjusted. The round hole perforator is constructed to make one perforation at a time. The cuts are cleaner if four or five sheets are fed in at once. On checks, two, three or more to a page, the perforator can be adjusted to perforate the length of the check, leaving the stub whole.



Latham Round-hole Perforator.
Front view.

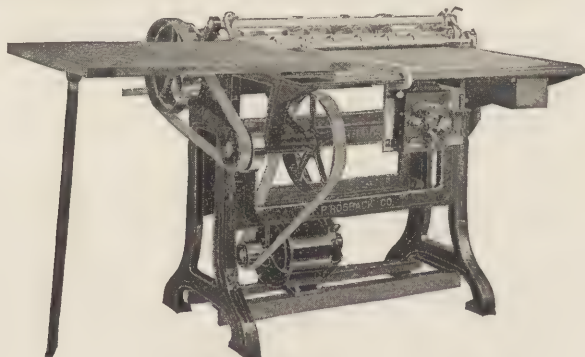
On the slot and slit machines, the paper is fed one sheet at a time, in the same manner as feeding paper into the ruling machine. The striker, when set for stub work, raises the cutters off the paper. As many perforations can be made with one feed as there are cutter-heads on the machine, usually six; but additional heads can be put on when necessity requires, as in stampwork. Thin, thick, or gummed paper can be satisfactorily perforated on the slit machine. Gathering perforated stock is greatly facilitated when sheets are perforated one at a

time. These styles are superior to the round hole perforation because of the number of perforations which can



National Rotary Slit Perforator.

be done with one feed. The speed in straight work depends entirely upon the ability of the operator. For

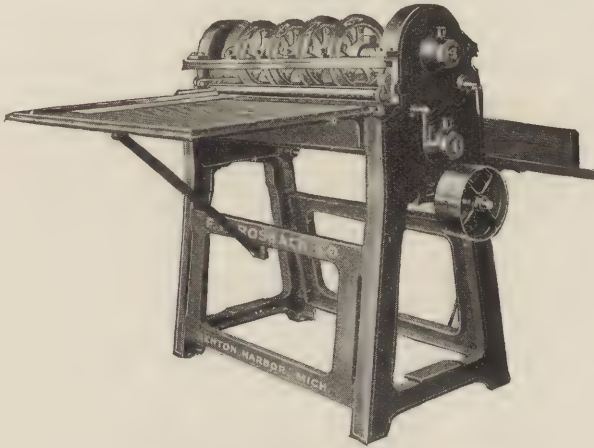


Rossback Rotary Perforator.

stub work, fifteen hundred sheets an hour can be fed through the machine. An attachment for scoring and

slitting is furnished with the slot and slit machine. Crimping attachments can be had on all slit perforators.

ROUND HOLE ROTARY PERFORATOR.—This machine will perforate, from one to eight sheets at a time, any size sheet up to thirty inches square. The number of perforations depends on the number of heads in the machine, which are usually four, but more can be added if required.



Round-hole Rotary Perforator.

For stub-line work all punches which are not to be used are dropped, and the lever which controls the striking gate is turned. The heads do not lift and the sheets will not perforate where the punches are dropped. All burr is flattened by means of adjustable steel rollers. All adjustments are simple and can be made in a few minutes. The quantity is governed by the speed of the operator.

JONAS AUTOMATIC ROUND HOLE PERFORATOR.—The Jonas Automatic Round Hole Perforator will perforate 2,500 sheets per hour, from one to four perforations to a sheet, any size up to 30 by 30 inches. Along the right side of the machine, there are four gates, each of which controls one line of perforations, and to this additional gates can be added, thus increasing the number of per-

forations through the sheet. These gates are adjusted to meet the varying requirements of perforations.

The sheets are fed into the machine from one to four at a time and held in place by the first gate. A chain with fingers releases the clutch when the sheets hit the gate. The punches are then set in motion and the paper is carried to the second gate. Then to the third and fourth in like manner. After the sheets leave the operator they are carried by tapes until all perforations have been made and deposited into the receiving box. Because of the absence of burr, the sheets can be easily separated.

GATHERING MANIFOLD SHEETS.

Manifold sheets must register on one another to permit the use of carbon sheets, and may be in duplicate, triplicate, or quadruplicate. The sheets can be perforated and numbered on the press, and gathered in the bindery, or they can be perforated, gathered, and then numbered. Large orders are usually perforated and numbered in the pressroom; this, however, depends entirely on the facilities to do the work. For all manifold work, use the same guides that were used in printing. Sheets that are delivered two, three, four, or more forms on should be perforated, gathered, and cut single when bound. To gather large sheets, set up a gauge at the top and left side, then start on the farther end with the original; pick up one sheet, bring it over on the duplicate, then bring both over onto the triplicate, then all three onto the quadruplicate, and lay the four sheets to the left, over against the gauges. Repeat this until five hundred sheets have been gathered. Then jog, lay aside, and continue until the job is completed.

NUMBERING.

In many establishments, numbering is done exclusively in the pressroom with machines set in the forms. The number of machines depends on the character of the

job. By making a separate impression of the numbering, the machines can be set as close as desired. This method permits a large amount of numbering, especially when there are long runs with from twenty-one to twenty-four receipts to a sheet. Care must, of course, be taken to avoid mistakes. This class of work is bound in groups, and an error in numbering would materially increase the



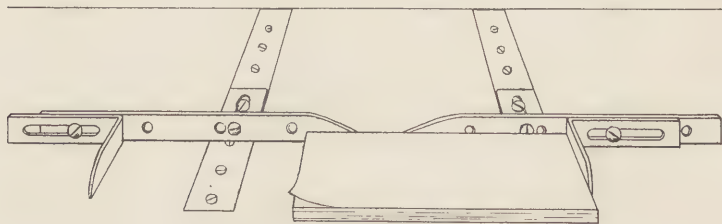
Paging and Numbering Machine.

binding time. All large manifold numbering orders should be carefully handled; if allowed to get mixed up, the segregation of books after the books are cut apart and trimmed is a serious item.

It is a mistake to set the numbering and run twenty or thirty reams, because it virtually means the handling of the entire job before a fair-sized partial delivery can be made. Then, too, it is quite impossible to put a job

of that sort through without mixing up the books. Segregating work done in this manner will prove expensive, and requires too much table room for putting in consecutive order. To expedite such work, set the second machine to begin with 2,001, the third with 4,001, etc. This will enable the bindery to finish a small lot and save considerable time in handling and table space. To keep the work in consecutive order, take a ruler's ink brush and run a red stripe down the head of the first lot, blue for the second, green for the third, purple for the fourth, two red stripes for the fifth, two blues for the sixth, and so on. This will enable the workmen to keep the books in place without mixing up the lots in the subsequent operations. When the numbering operation is done by the bindery, the sheets when received are first perforated, then each lot numbered (original, duplicate, triplicate, or quadruplicate) separately and consecutively, and then gathered. This enables verification of numbering while gathering.

Numbering machines are made to operate by foot or by power. The head adjusts itself to the amount



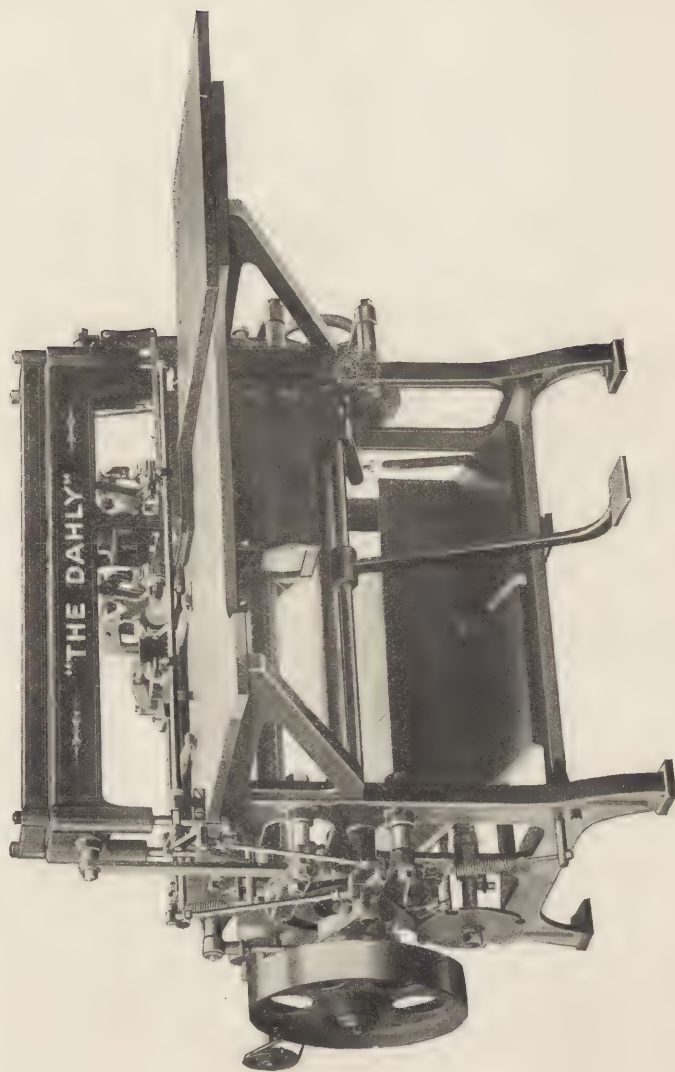
Duplicating Numbering Machine Gauge.

of paper up to about three-eighths of an inch. An even impression is secured on all sheets. In the majority of machines the changing from consecutive to alternate numbering is accomplished by changing the position of a screw. The repeating arrangements are excellent, as they are capable of repeating from two to sixteen times

by inserting or changing a disc on the side of the numbering head. In setting type for receipts which are numbered in duplicate, the position of the numbering space should align on the sheet, as quicker numbering can be executed. The gauge shown in the illustration expedites duplicate numbering. Whenever possible on large quantities of receipt books numbered in duplicate, they should be numbered so that they can be bound two or more receipts to the sheet, thus saving considerable time in binding without materially decreasing the numbering output. In numbering and paging, the ink should be used sparingly and the inking roller adjusted so that it will barely touch the figure head. Worn rollers will not produce a clean, even number, hence a supply should be kept in stock and the rollers changed when worn. A composition roller is preferable to the rubber roller, and the necessary stocks and molds can be procured from the machine manufacturers.

COMBINATION PERFORATING AND NUMBERING MACHINE.

The combination perforating and numbering machine is designed for bank and check work, or any class of similar work that requires perforating in two directions and numbering in duplicate. It perforates in two directions (right angles), and numbers stub and check at one operation, automatically feeds the sheets to proper distances, and repeats the operation the desired number of times, and stops; it then conveys the sheet to continuous rollers, which reverse and deliver it to the receiving box in consecutive order. It will do work as above described on check sheets (five on) with one operation at the rate of three thousand eight hundred or more completed checks per hour. It can be quickly and accurately set by gauges, and a graduated scale is provided to handle checks in sizes from one-fourth of an inch to four and one-half inches deep, and any length up to eleven and one-half inches. It will take check sheets three on, four on, five on,



Automatic Perforating Numbering Machine.

six on, or more. If desired, it will do down-line perforating only. It will automatically skip the fifth cross-line perforation on check sheets of five on; also skip the third and sixth cross lines on check sheets at one time when perforating only. The machine will do continuous angle perforating at the rate of two thousand one hundred check sheets per hour, or over ten thousand checks per hour (five on).

The numbering heads can be shifted and locked to print at any point desired on the right half of the check, and at any point desired on the stub.

PADS.

For convenience in handling, blank forms are padded in lots of fifty or one hundred. For scratch pads, the pad counter can be employed. This can be adjusted, but accuracy as to the exact number of sheets is, of course, impossible, as that depends on the solidity of the pile and the pressure of the hand. Count the sheets into lots of one hundred or fifty, as desired; cut pieces of pulp-board the exact size of the paper, place between the lots, jog evenly on the end to be padded, and lay with the edge even on the edge of the bench. Place sufficient weight on top to prevent the glue from running in between the sheets. Apply a coat of padding composition (see under "Glue"), and place a piece of crash or super the width and length of the pile on the edge. Rub this down with a piece of binders' board, and leave to dry. After a lapse of about thirty minutes, spread on a heavier coat of composition, then leave to dry over night. To cut apart, take a sharp knife, preferably one used by finishers for cutting gold leaf, place it under the board with a slight slant, shove it from right to left. Trim margins should always be provided to remove the dirty and uneven edges.

On large orders of memorandum pads, padding can be done in gangs and cut apart on the cutting machine. The bevel caused by the knife is trimmed off, and, as the glue

is flexible, breaking is prevented. Color in the padding composition or glue should be avoided, for, if the glue should run between the sheets, it would stain and spoil them. If the quantity warrants it, the sheets can be placed in the signature press and bundled; the operation continued as above described. This saves bench space, and the pressing produces a perfectly flat pad.

TABLETS.

All sheets to be made into tablets are counted, unless they are numbered in lots, as desired, and should not exceed two hundred sheets per tablet. Numbered sheets should never be delivered loose, as they are apt to become lost or soiled. A piece of pulpboard is placed on the bottom, the back edge of the paper jogged, a weight put on, and the head edge glued. The paper cover is cut large enough to cover the back and project about one and one-half inches on the pulpboard. The end of the cover paper is pasted wide enough to stick to the edge and pulpboard; the tablet is laid on, the end brought over and rubbed down with the thumb and index finger of the right hand, and laid aside.

Perforated tablets must be provided with a binding margin from three-fourths to one and one-fourth inches, through which the sheets are stapled.

If card or tag board is desired for the front, the board is laid even with the edge on plain tablets, or one-eighth of an inch from the staple on stapled tablets, and a piece of cloth is glued or pasted over the back, extending one-fourth of an inch on the cardboard and about one inch on the pulpboard. The tablets are stacked, fronts and backs alternating, backs out, and when dry they are trimmed.

QUARTER-BOUND, CUT FLUSH.

This style of binding is appropriately used on check, manifold or receipt books. They can be bound in gangs and cut apart when binding is completed. The number of

sheets in a book should not exceed one hundred and fifty of the ordinary weight of paper. The necessary binding margin should be provided in printing; the width depends on the character of work. Stub books which must open sufficiently in the center to permit writing, require from one to one and one-half inches, while manifold books which are perforated near the end require about three-fourths of an inch.

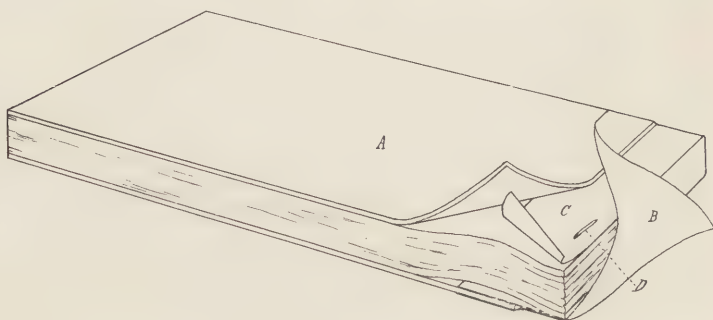
For end-sheets, cut two sheets for each book of the same quality and color as the book. Place one on the top and bottom, jog the sheets on the binding end, and lay them on the edge of the bench with a scrap piece of board on top and bottom of the pile. Lay a weight on top, apply a medium-thick glue to the edge, and leave to dry. Then cut apart between the end-leaves, and lay aside. Cut strips of cambric or muslin one inch wide, paste, and lay on the end-sheets close to the binding edge. Or end-sheets may be made beforehand and laid so that the muslin will come in contact with the sheets; the edges are glued and the books separated as above described. Stitch the book with as many staples as are required according to the size of the book; and if the staples are not properly clinched, take a hammer, place the book on a beating iron, and flatten them.

Cut the strawboard one-half of an inch narrower than the width and the length of the sheets. Apply a thin coat of paste, lay the boards one-half of an inch from the binding edge; when ten books have been boarded, they should be pressed. Large quantities should be nipped in lots of ten and subsequently placed in the press over night with a press board between every ten books. Then cut the material for the back (cloth, drilling, or leather) two and one-half inches wider than the thickness and the length of the book. Glue the material with a medium-thick glue, and lay it about three-fourths of an inch on the board; then with the thumb and index finger rub the joint and back; turn the book over and repeat the operation. The

marble paper is cut the length and one inch less than the width of the book. Place the paper in convenient lots on a piece of waste paper, paste with a thin paste, double each sheet, and lay aside. Then turn the pasted lot over, open up one at a time, taking the two ends of the length and bringing it over on the edge of the back material; then rub the hand down the center and continue rubbing right and left from the center to the ends. Place the books between strawboards, and leave to dry. The next operation is trimming.

QUARTER-BOUND, MARBLE JUTEBOARD, CUT FLUSH.

A very simple and cheap style for check or receipt books can be made by substituting No. 40 or No. 50 marbled or fiber-grained juteboard for strawboard. This



A — Marble jute board. B — Cloth back. C — Cloth joint. D — Wire staple.

eliminates the pasting of the board to the end-leaves and marble paper on the sides. Cut the juteboard one-half of an inch narrower than the width of the sheets, and a piece of book cloth or drilling for the joint about one and one-fourth inches wide and the length of the sheets. Fan out the boards about three-fourths of an inch on the inner side, and apply a coat of glue. Then place the cloth or drilling on the glued portion, and rub down; this leaves one-half of an inch of the cloth for the joint. Place the sheets between the boards with the hinge on the bind-

ing edge and the cloth in contact with the sheets. Place scrap pieces of board on the sides of a convenient pile, and jog the binding edge. Place the pile on the edge of the bench, and apply a coat of glue. When dry, cut apart between the boards, and adjust the stitching machine to the thickness of the books. Stitch the books with two, three or four wires, according to the size. If the machine fails to clinch the wire, place the book on a piece of iron and hit the staples with the hammer, enough to lay the staples flat. Take a strip of paper and measure the cloth back so as to allow one and one-fourth inches from the edge of the back, which will give three-fourths of an inch on the board and one-half inch for the joint, or two and one-half inches plus the thickness and the length of the sheets. Glue the cloth and lay it about three-fourths of an inch on the board; then with the thumb and index finger rub the joint and back; turn the book over, and again rub the cloth down. Lay the book aside, and repeat the operations on the remaining books. The fore edges and backs of the books are alternated with the backs out to dry. The next operation is trimming.

SIMPLEX BOOK AND TABLET BINDING MACHINE.— This machine puts on cloth strips on the backs of composition, reporters, pass, check books and tablets. It will handle work from three-sixteenths to one inch in thickness, with either round or square backs. The cloth cut-off adjusts itself to any length up to five inches. The adjusting of the machine for different thicknesses can be done in a few minutes, by turning a handwheel and regulating the guides for the strip. The capacity of the machine depends on the speed of the operator, but ordinarily from eighty to one hundred and fifty books per minute can be produced.

PAPER BOARDS, CUT FLUSH.

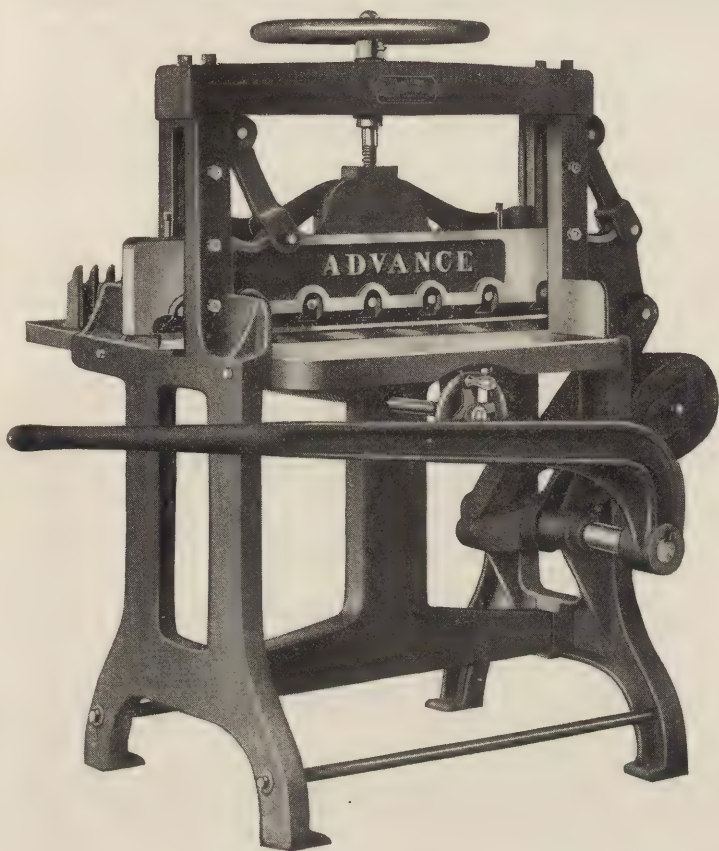
This style finds favor on manifold work where a somewhat stronger binding than the quarter-bound, cut flush,

is desired. Being covered with heavy cover or manila paper enables the record clerk to write the proper designation on the cover and back. This is a popular post-office style, because it is sewed, opens flat, and the leather back gives it the strength necessary. See the section on folding and sewing for instructions on these operations. The backs are glued as described in that chapter, and slightly rounded. Cut a piece of goat split or fleshers two and one-half inches plus the width and the length of the book. Pare the ends as described in the chapter on paring leather. Apply a coat of glue to the backs, a medium-thick paste on the leather, and fold it over. When the leather feels tacky, open it out, draw it over the backs on the sides, rub it down with a folder, and lay aside, the fore edges and backs alternating, with the backs out. Cut the boards the length and three-eighths of an inch narrower than the width. Apply a medium-thick paste, and lay the boards on the end-leaves of about ten books, three-eighths of an inch from the edge of the back. Place them in a press, give hard nip, and proceed with the balance in the same way. When all have been boarded, place them in the press with a board between every ten books, and give them a firm pressure over night. Then cut the cover or manila paper wide enough to cover the entire book. Apply a medium-thick paste to about ten pieces, fold over before putting them on the books, and lay aside. Open out one at a time, lay the book even at the head and fore edge, and bring the other half of the sheet over the back on the side. Then rub down on the back, sides and joint, and lay aside to dry. The next operation is trimming, and if required, pasting printed labels on the sides.

TRIMMING.

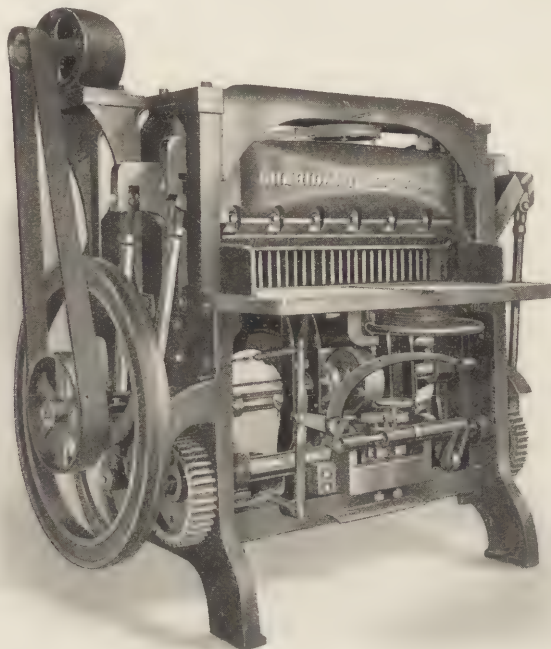
A common error made by printers is to make up forms the full measurement of the page, thereby leaving the binder no trim margin. A standing rule of every printing and binding establishment should be to allow one-eighth

of an inch trim margin for the fore edge, head, and tail of all stitched tablets and quarter-bound cut-flush books. All sewed books should have three-sixteenths of an inch for the fore edge, and one-eighth of an inch for the head



and tail trim margins. The trimming of letterpress work should be standardized, so that paper-covered books are trimmed a trifle larger to permit a retrim when books are returned for a substantial cover. To illustrate this, a sheet 24 by 38 inches made up into 32-page signatures, when folded, is 6 by 9½ inches. The paper-covered books

should be trimmed $5\frac{7}{8}$ by $9\frac{1}{8}$ inches; one-eighth of an inch is trimmed off the head, the balance off the tail, while the fore edge has one-eighth of an inch trim. These books when returned for permanent covers, as they frequently are, have one-sixteenth of an inch trimmed off



the head and tail, and one-eighth of an inch off the fore edge. This gives the standard book size, $5\frac{3}{4}$ by 9 inches, for the bound volume.

When the entire edition is to be bound with a permanent cover, provision is made for three-sixteenths of an inch trim at the head. This enables the printer to standardize forms without varying the head margins, and gives the binder sufficient margin to trim in accurately-folded sheets.

To trim books on a cutting machine, take as many as will make about three inches, and jog at the head and back. Set the back gauge the exact size to which the book is to be trimmed; put the books in the machine with the head against the side and the back against the back gauge. Run down the clamp, provided the machine has a hand clamp; an automatic or self-clamp requires nothing more than to pull the lever. When the machine stops, remove the books and put to one side. Repeat this operation until all books are trimmed on the fore edge and lay aside in piles with the backs out.

To trim the heads and tails, fillers must be made to take up the thickness of the back. Cut strips of straw or binders' board about four inches wide; glue them together; fan out and press. Put the books in the machine with the heads against the back gauge and the trimmed fore edges against the side; then lay the board filler on top in such a way that the fanned-out ends are sufficiently away from the back to permit an even pressure of the clamp on the books. Pull the lever, and repeat the operation for subsequent books. The filler can be glued to the clamp, and the books put directly under it.

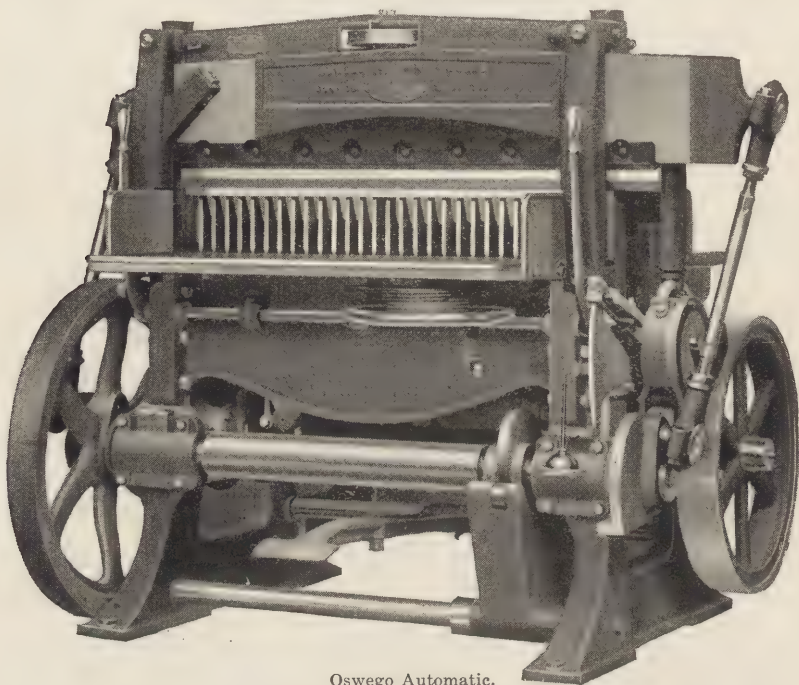
For the head, the split gauge is set forward, and the trimmed tail end is placed against the back and side on the other end of the machine. The board filler is placed on top in the same manner as above described, and the operation continued. On thin books the board filler may be dispensed with by reversing and alternating the backs so as to distribute the swell on both ends.

If there be two splits in the back gauge, set the center for the fore edge, the left for the tail, and the right end for the head. This, however, should only be done when the quantity to be trimmed justifies it. When the back gauge is set, tighten the set-screw with the hand. Wrenches were not made to use on thumb-screws, hence should not be used for this purpose. To guard against the depression across the end by the pressure of the clamp,

cut a piece of binders' board somewhat longer than the width of the clamp, and glue it on.

Waste leaves should be placed on the top and bottom of all enameled or glazed stock to keep it clean.

To trim quarter-bound cut-flush tablets or pads which are bound two or more on a sheet, as in the case of receipts, trim the fore edge, cut all the tails alike, then



Oswego Automatic.

the heads. The knife should cut against the back. In making up books to be bound two or more on, one-fourth of an inch trim must be provided for, to clear the bevel caused by the knife. This is provided for if books are made up with one-eighth of an inch trim for the head and tail. Thick books can be bound two or more on until the stitching is completed. Then cut apart and proceed with the rest of the binding in the regular way.

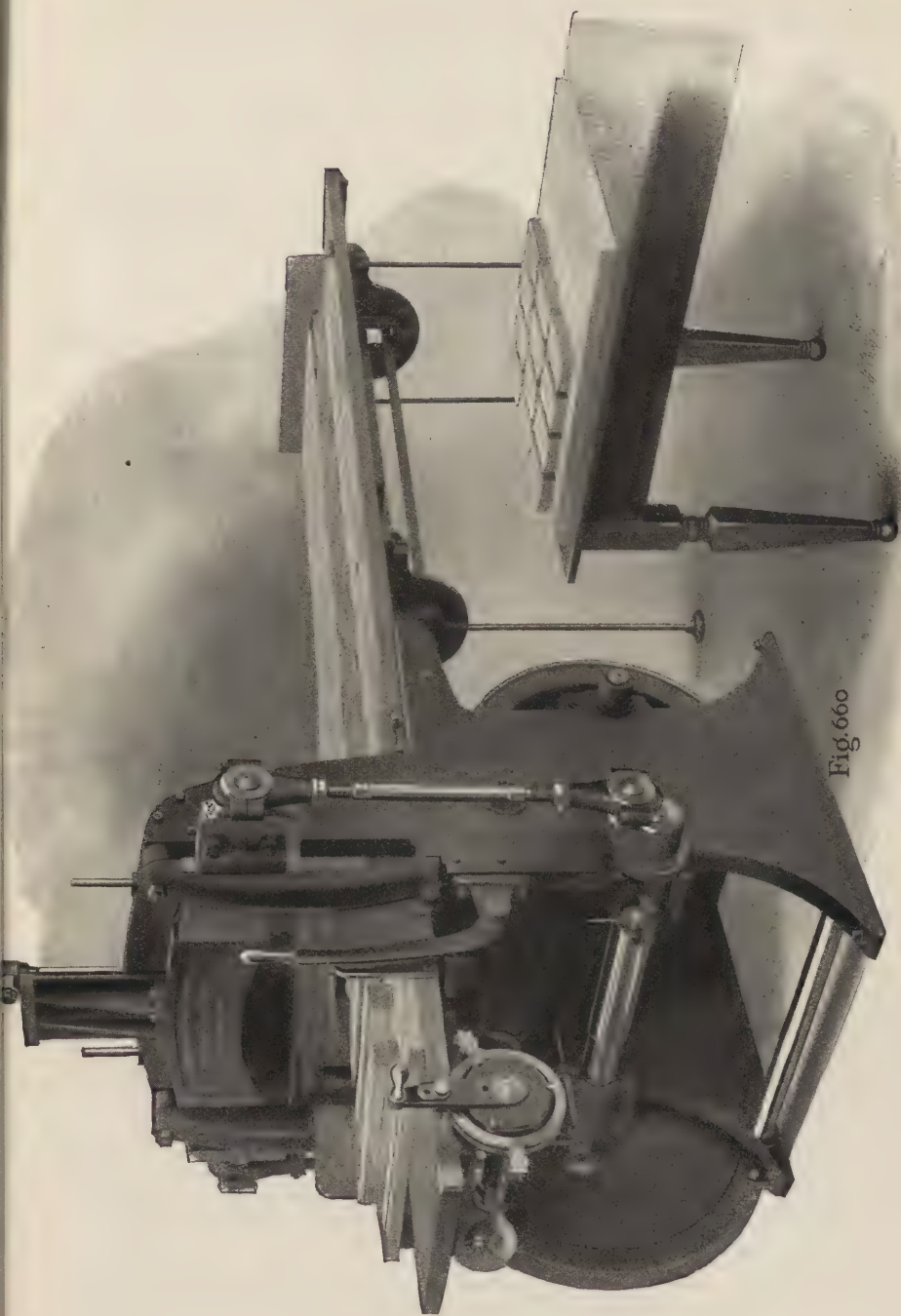
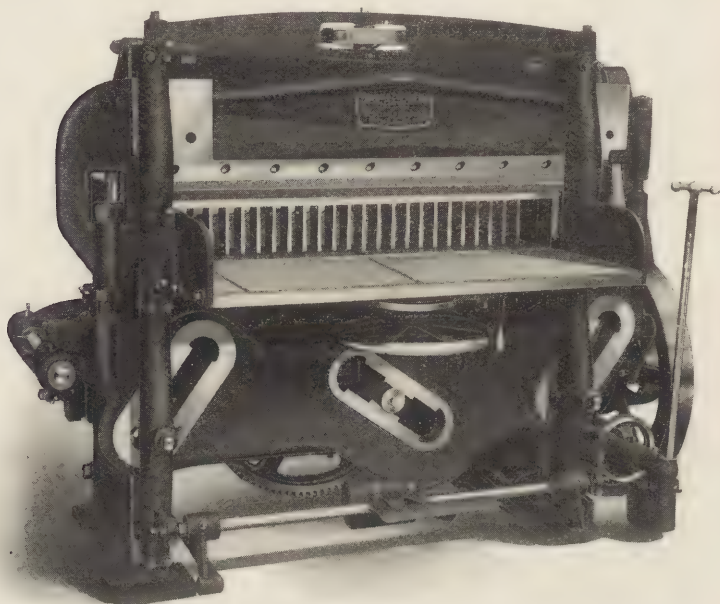


Fig. 660

The New Rapid Oswego Strip and Label Cutter.
Pioneer Oswego patents allowed controlling new and exclusive improvements. Furnished in all Oswego stock widths from 32-inch up to 84-inch.

AUTOMATIC CLAMP CUTTER.— These cutters have a self-clamping arrangement which is independent of the knife and which can be adjusted to vary the pressure on the pile. Any size pile or weight of paper may be clamped securely with an even pressure. The descent of the clamp is gentle, and it packs the stock without jarring the sheets out of position, and maintains an even pressure during

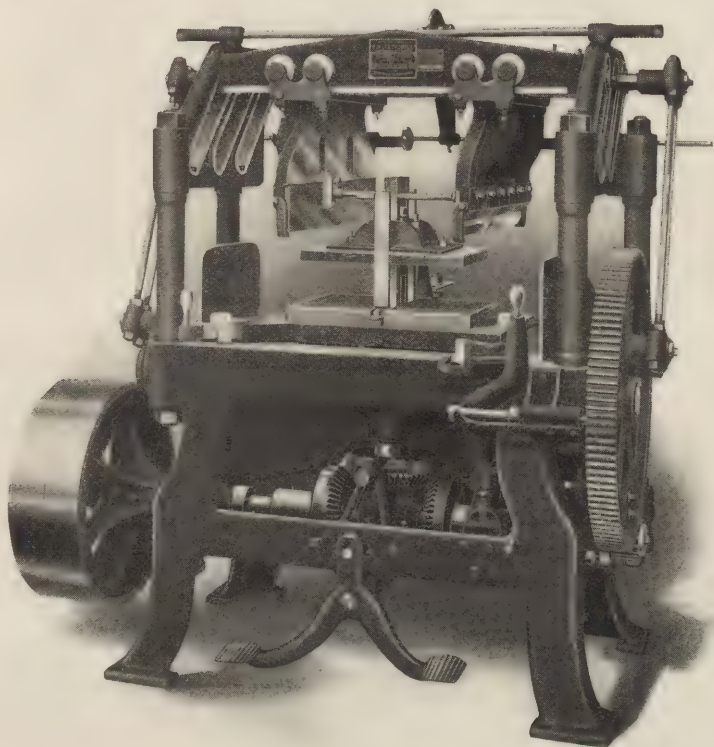


Seybold 20th Century.

the stroke of the knife. A positive throw-out is provided to stop the machine after every cut. The indicator wheel for the back gauge is a great help for rapid adjusting of the gauge, and reads its position to the sixteenths of an inch. Micrometers may be attached which will read to six one-thousandths of an inch. The treadle may be held down upon the pile after the cut has been made, so as to prevent narrow, unstable piles from falling over. The side gauges are flush with the frames on each side, front

and back. The knives are easily removed for sharpening, and the adjustments are simple.

DUPLEX BOOK TRIMMER.— The unique feature of this machine is that instead of one knife, requiring four turns of the piles, it is built with two parallel knives, requiring



Seybold Duplex Trimmer.

only one turn of the table to trim four edges. Two piles on all sizes from $2\frac{1}{2}$ by 5 inches to 12 by 16 inches each, and six inches high, are automatically clamped, cut and unclamped. The double knives, obviating any twist, produce exact results. The only adjustments are lowering the knives to take up wear from grinding, setting two

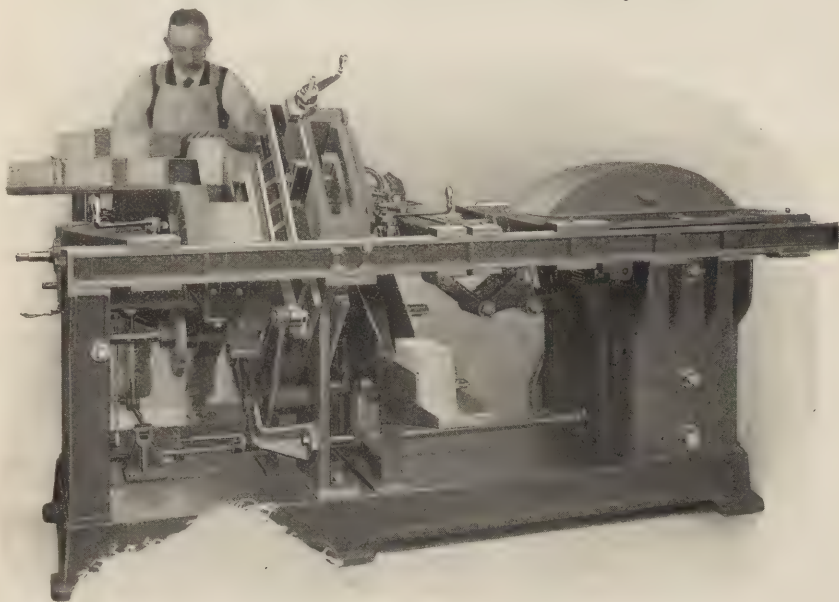
collars to govern the knife-bar movement according to the size of the piles, and setting the back gauge.

A number of different sizes of pattern blocks to correspond to the trimmed sizes of books are required. To trim books, adjust the pattern blocks in the machine to the clamping mechanism, set the collars to govern the knife-bar movement according to the size of the piles, and set the back gauge. Two piles of books are placed back to back on a movable table, which exposes to view the four edges which are to be trimmed. By pulling the lever, the mechanism is set in motion, the piles clamped, and the knives then descend and trim the fore edges. The other untrimmed edges are brought under the knives by giving the table a quarter turn, which brings the knives into correct position for the head and tail trim. The books are then released from the clamp pressure and removed.

AUTOMATIC BOOK TRIMMER.—This machine is designed to trim books and magazines on three sides at one operation. It will trim all sizes of books within the range of the machine — from 4 by 6 inches to $8\frac{1}{2}$ by $11\frac{1}{2}$ inches, and from one-fourth of an inch to four inches in thickness. The change from one size to another and from one set of knives to another is simple and quickly made. There are no cutting sticks, and the knives cut against uncut work only, which obviates the necessity of using the shears when cutting sticks become worn. The operator, at proper intervals, feeds a handful of books, three or four inches thick, to the gate, which releases itself, and the books drop into a work holder, which supports the books at an angle of forty-five degrees. Thus the books are jogged without assistance from the operator. The work is subjected to a pressure of from three to four thousand pounds, and then moved to the rear, about seven inches, against the three knives, which are carried by a stationary trimming plate. There is a shear motion on all three knives equal to the travel of the bench of books, which takes place while the bench travels and the

knives cut. The plungers then unclamp and retire from the rear end of the bench; a handful of books is discharged into the receiving trough; the gate is released, and a new handful of untrimmed books is dropped into the place, and the operation is repeated. As the books are clamped and unclamped several times in order to discharge handfuls of work, they are thoroughly smashed and uniform in thickness.

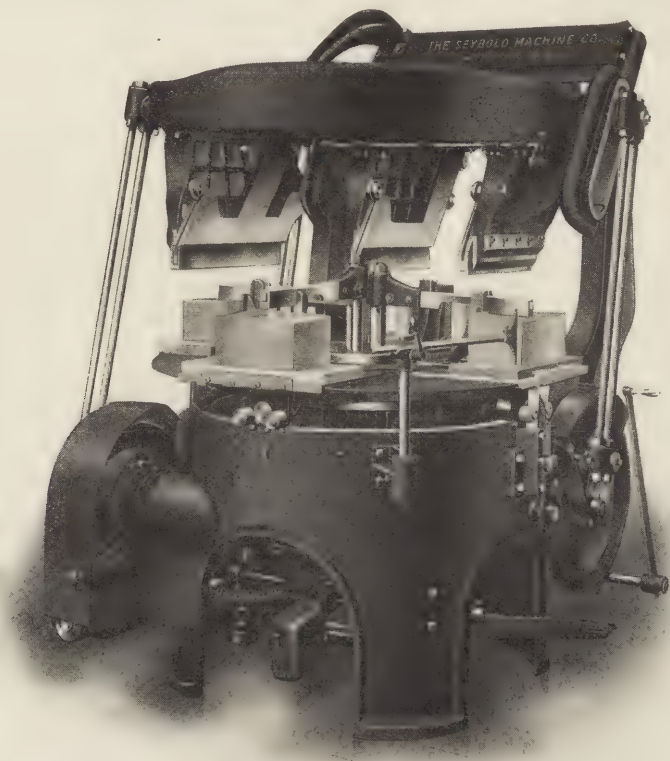
This machine requires one operator and two helpers — the one to place books on the feed table, and the other to take the books from the receiving trough and stack them on a truck. The operator can readily feed from



Smyth Automatic Book Trimmer.
E. C. Fuller.

twelve to fifteen handfuls of books per minute, which means from two thousand to twenty-five hundred books one inch thick per hour. From four thousand to six thousand magazines one-half of an inch in thickness can be trimmed per hour.

CONTINUOUS TRIMMER.— This machine is capable of delivering six hundred piles six inches high per hour. It will trim sizes as small as $3\frac{1}{2}$ by 6 inches, and as large as $13\frac{1}{2}$ by 18 inches. The changes from one size to another are very simple, and consist of turning the cranks that

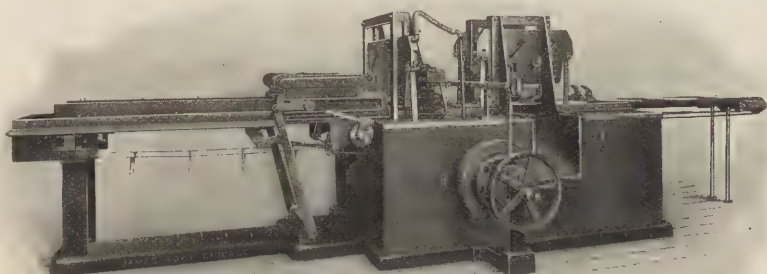


Seybold Continuous Trimmer.

regulate the space between the head and tail knives, and shifting the four back gauges. There are three knives provided with automatic clamps and a revolving table which carries the books under the knives. When the heads and tails of one pile are being trimmed, the fore edges of

the other pile are also trimmed. The operation is continuous after three piles of books have been put into the machine, as the table makes one-quarter revolution at each movement.

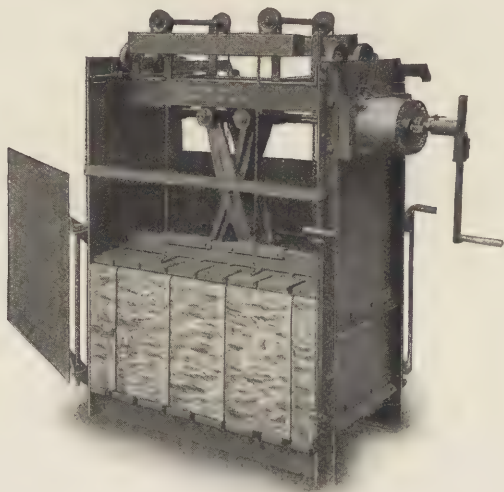
In placing the books in the machine, one pile of books or pamphlets is handled at a time in front, three feet away from the nearest knife. This leaves both hands free



Rowe Straight-line Automatic Book Trimmer.
Capacity 24 packages of $4\frac{1}{2}$ or less in. thickness per minute.

to hold the pile in position, while with the foot the clamping pressure is applied to hold it until the final pressure is applied by the automatic clamp which each knife carries with it. The clamp accommodates itself to any swell in the back of the books or pamphlets. The pile is held firmly against the back and head gauges while the first pressure is being applied. As soon as the pile is put in position and the foot clamp is brought down upon it, another pile is prepared in the machine. While so doing, the table has revolved a quarter turn, carrying the pile previously placed into position between the knives that trim to the head and tail. By the time a second pile is prepared, the table has come to a stop; and while the knives are cutting the first pile, the second pile is placed in position. After the head and tail cuts are made, the table makes another quarter turn, carrying the first pile to the opposite side of the machine to the operator.

The table is brought into proper position when it stops by means of a wedge that lifts it between two rollers which carry it to exactly the same position at every stroke of the knife, so that variation is impossible. The action of the shear movement knives cutting at both ends at the same time is toward the back gauge, against which the backs of the books or pamphlets rest. All three knives are stationary and carried by immense, heavy stocks, all of which are attached to a head or platen of great strength to insure rigidity without trembling or vibrating. The knives are in constant operation with a slow, steady movement, and are pulled down by three sets of steel rods. A number of small cutting sticks laid parallel, locked in by means of quoins so that each stick may be turned separately and shifted, obtains many cutting surfaces on one set of sticks.

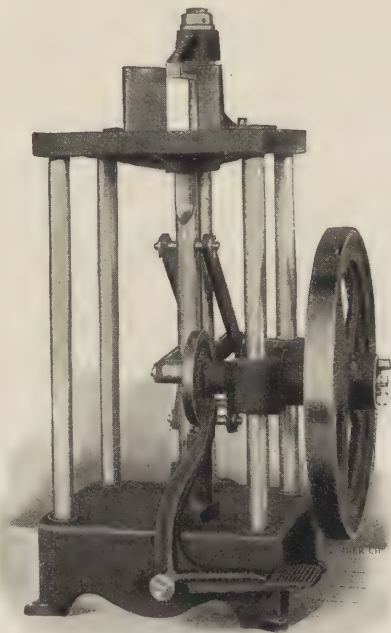


BALING PRESS.—The baling device may or may not be run by power attachment. It is a press to compress large quantities of waste paper into large bales. The machine is provided with channels for baling wire, pressure is

applied by turning a handle, and when the hopper has been filled to its full capacity, the wires are fastened and the bale released. The waste is deposited daily into the press, and when a number of bales have accumulated, they may be sold to the nearest paper mill. Not only are cash returns thus brought in, but there is a saving of insurance, as well as the gain in space and tidiness.

ROUND-CORNER CUTTER.

The shafts and toggles of this machine are of steel, solidly built. A clamp holds the paper securely. The fly-



Seybold Power Round-corner Cutter.

wheel devices operate the pulley and rotate an inner disk. To this the steel toggles are fastened and so adjusted that they pull the clamp down to the paper and on to one sheet or to a pile four and one-half inches high. As soon as the

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clamp has a firm grip upon the pile, it stops. The knife, beginning to rise, is pushed upward until it meets the cutting face on the lower part of the clamp, so that, while the cutting is done, the clamp and knife pull against each other, and the cut is clean and perfect. The clamp may be raised or lowered by upper and lower set-nuts. The table gauges are adjustable in any direction. The wooden cutting stick may be removed when worn out. These machines have three forms of knives. The size of the table is 16 by 20 inches.

GLUE.

There is no other material which enters into the general production and contributes to the permanency of books of which there is as little known as glue. The substance of glue is animal matter, such as bones, cuttings, hides, skins, sinew, feet, tails, snouts, ears and horn pith. Various parts from cattle, calves, goats, horses, sheep, pigs and rabbits yield glue having peculiar properties. Poor material in this, as in any business, will not yield a first-class product. The best material, if allowed to lie around, will decompose, and can only result in a low grade of glue. It is generally conceded that hide glue furnishes the best adhesive properties. Not infrequently it is expected that the cheapest glue will fill the requirements of the best. However, the average glue manufacturer sometimes receives complaints regarding the best glues. Investigation reveals the fact that eighty per cent of these complaints are due to the glue melting pots not having been cleaned for months, or to the carelessness of the worker in permitting continuous boiling.

The glue tank with six pots and a large kettle in the center which is commonly used in bookbinderies ought to be condemned, as the constant evaporation causes the glue to thicken and "skin." Uniform heat can not be maintained, and not infrequently the tank boils over. The glue waste is enormous in proportion to the consumption.

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The ideal cooker is one that has a water jacket and air-tight glue chamber. The glue is drawn into the individual pots from a faucet. The water jacket is kept at a uniform heat by steam seepage through a siphon and the water level is automatic by means of a return pipe.



Wetmore Electric or Steam Glue Heater.
Advance Machine Co., Toledo, Ohio.

The glue is never boiled, does not thicken or skin, and can be kept for two weeks without material injury.

The ideal pot is the electric-heated copper pot set in a cast-iron water jacket. Deep glue pots are responsible for much waste of time in cleaning the hands and handle before using.

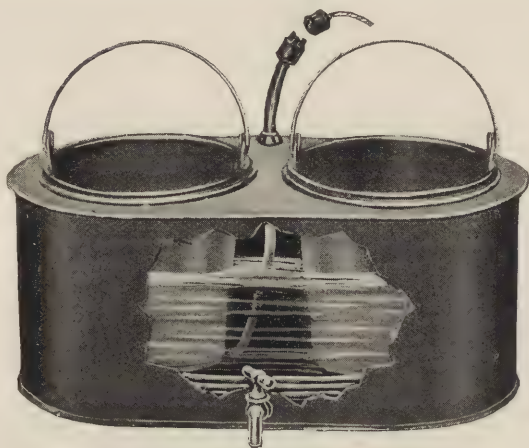
Glue is purchased in flakes, sheets, cakes, strips, ribbons, or in pulverized form. In soaking glue, it is necessary to immerse all in water, as protruding pieces require considerable heat to dissolve, and tend to spoil the glue. Ground glue must be soaked in the same manner and requires frequent stirring. The erroneous opinion prevails that ground glue is an inferior article which contains sawdust and floor sweepings. Manufacturers can ill afford to sell an inferior article for first-class material.

Some large binderies heat the glue in a large vessel with direct steam, and the workmen have small pots which are filled from this. Direct steam is injurious to solution of glue; the drastic action of the steam weakens it. If the best glue is continuously boiled with direct steam for twenty-four hours, the gelatinizing power of the glue will be destroyed. Cheaper glues are destroyed in much less time. Glue boiled with direct steam for one hour loses a grade in strength, and a half grade if boiled in the regulation water tank at two hundred degrees for the same length of time. If the direct steam is employed, it is folly to boil the water until all is dissolved. Let the steam pass through the water in the tank in which the pots are set until the temperature is one hundred and eighty degrees, Fahrenheit. If no thermometer is at hand to measure the degree of heat, this may be approximately done by the cessation of the rattling noise produced by steam when passed under pressure into cold water, followed by a subdued rumbling. When this degree of heat is reached, stir the glue until dissolved.

If the glue has been properly softened, it will dissolve at a low temperature. Hot or warm water should not be poured on dry glue, as it actually retards softening. If the heating is done by gas or electricity, the pot must be

surrounded with water and when the water comes to the boiling point the heat should be turned off.

Glue pots should not be set on a fire, as the glue will burn and char. All accumulations of skin on the top end of the pot should be removed before another melt is attempted. Thus the danger of souring glue is eliminated. Absolute cleanliness is necessary in handling any glue



Wetmore Electric Glue Pots.

stock. The glue is first softened and melted in a large central kettle, the solution being made to produce a stiff jelly. This mixture will require the minimum temperature to dissolve.

Glues which dry too quickly for certain work can be treated with small quantities of the following ingredients: glycerine, glucose, nitric or acetic acid.

The addition of boracic acid to a first-class quality of glue will cause it to stick to metal if the part be washed with benzine or muriatic acid before applying the glue.

WATERPROOF GLUE.— To one pound of dissolved glue add one pound of glycerine. Rub up sufficient red lead into glycerine to produce a consistency of thick syrup,

add one ounce to the glue and glycerine mixture and apply warm.

Another formula frequently recommended is as follows: dissolve sixty grains of sandarac in one pint of pure alcohol and oil of turpentine; dissolve one pint of glue and one pint of isinglass; pour these mixtures together until a paste is formed; this is strained through several layers of gray super and set aside — it must be warmed up before using.

Still another recipe is claimed to be the best, as it finds favor in ship-building: dissolve one-half pound of india rubber in two gallons of turpentine or naphtha; then add an amount of shellac equal to the weight of the solution. Mix this thoroughly and stir frequently for a few days. This can be warmed up before using, and will stick to metal or glass first washed with muriatic acid.

LIQUID GLUE.—Dissolve three pounds of glue in one quart of water; then stir into this gradually one ounce of nitric or acetic acid. This is always ready for use and possesses strong adhesive properties.

CEMENT.—Dissolve one ounce of isinglass in about five ounces of hot water; add one ounce of fifty per cent alcohol. Dissolve one and one-half ounces of gum ammoniac in three ounces of alcohol. Mix both solutions thoroughly and leave stand over night.

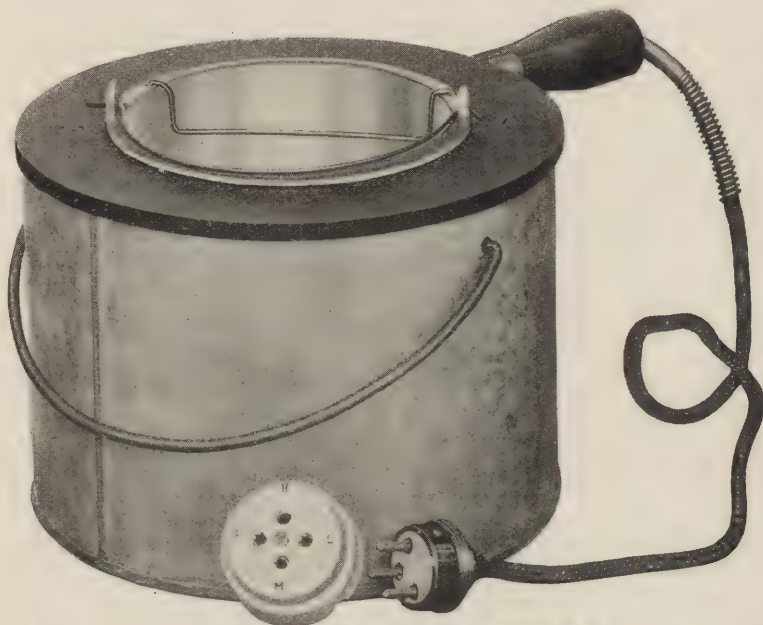
A cement for celluloid is made by taking four ounces of shellac, six ounces of spirits of camphor, eight ounces of ninety per cent alcohol, and dissolving in a hot-water tank.

Celluloid edges may be joined together by moistening the edges with a preparation of alcohol and ether, and leaving under pressure over night.

GUM.—A gum which finds favor in gumming envelopes is made by dissolving one-half pound of gum arabic in water, and stirring in two pounds of glucose. When dissolved, add one-half pound of starch, and boil. This can be diluted with water as needed.

Dextrine can be substituted for gum arabic, but must not be boiled. Add boric acid to thicken and preserve it.

STICK GLUE.—Dissolve ordinary pale glue in water, then heat, and when thoroughly dissolved, add four ounces of glucose. Then pour it on a glass or a marble slab, and when cold cut it up into convenient pieces.



Gane Bros. Individual Electric Glue Pots.

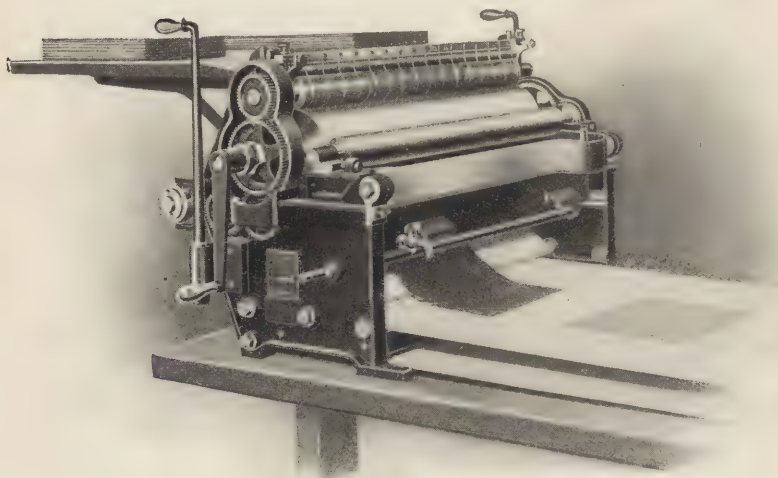
Another formula which can be used for the same purpose consists of:

- 1 ounce of gum tragacanth
- 2 ounces of glycerine
- 6 ounces of gum arabic
- 4 ounces of gelatine

to which add a few drops of oil of wintergreen or sassafras. Add one pint of water, and allow to dissolve. Then heat, pour on glass or marble slab, and cut up into pieces.

PREPARED GUM.—Dissolve one pound of gum arabic in three pints of cold water, add a tablespoonful of glycerine and two ounces of honey. Strain this and apply with a soft brush. If properly prepared, this gum will dry flat. Curling of the paper or breaking of the gum is eliminated.

A strong gum is made by dissolving aluminum sul-

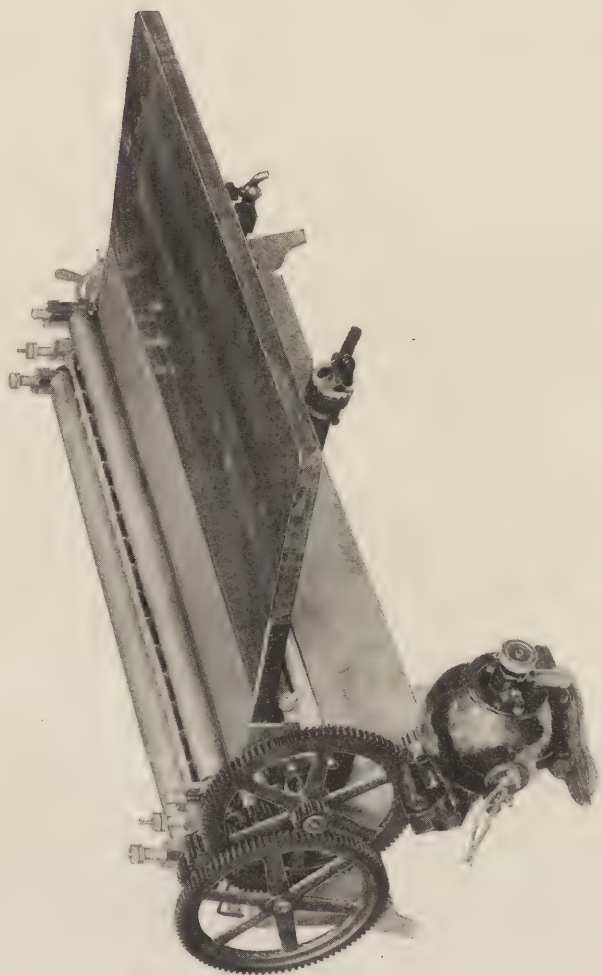


Smyth Gluing and Gumming Machine.
E. C. Fuller.

phate in water and adding a small portion to a solution of gum arabic.

PADDING COMPOSITION.—The ordinary glue is too hard for pads, and to make it flexible the following will be found to meet the requirements:

To one pound of glue add four ounces of glycerine, one and one-half ounces of glucose or one and one-half ounces of linseed oil, and one-tenth of an ounce of tannin. Dissolve in water and heat until melted. Any aniline or Diamond dye colors may be added as coloring matter. The flexibility of the composition can be increased by



Gane's Bench Gluing Machine.

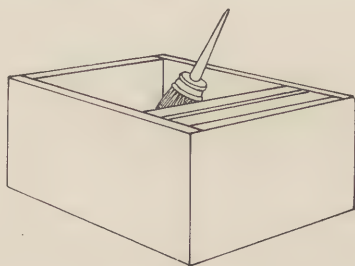
adding glucose and glycerine. Prepared composition can be purchased from bookbinders' supply houses.

GLUING AND PASTING MACHINE.—This machine is designed to glue and paste any kind of fabric, and delivers the stock wet side up on to a conveyor which travels from the feeding operator. It may be accurately adjusted to regulate the amount of adhesive desired on the material. The entire surface may be coated or any portion of it; hot or cold glue, paste, dextrine, mucilage, or similar material may be handled satisfactorily. The glue may be heated either with gas or electricity. Adjustable scrapers keep the roll free from all hard lumps of glue or paste, making it seldom necessary to wash the roll, and insuring the application of a fresh, clean coating of glue to each sheet. The conveyor passes along the top of the forwarding table and in a convenient position for the removal of the glued or pasted sheets. The speed of the machine is sufficient to keep from twelve to twenty forwarders busy with one feeding in the fabric. A saving in adhesive material is effected, as there is no waste. On some machines, boards may be glued or pasted.

PASTE.

The most common article in a bindery is paste, and the forwarder's success depends upon its judicious use and correct preparation. Paste can be purchased in barrels from paste manufacturers, but some prefer to make it. This is best accomplished in the following manner: The best cooking plan is to have a vessel made of copper large enough to fit inside the glue tank; cut a mixing and beating stick wide on the end and round for the handle. Put the wheat flour in this vessel, and gauge the quantity by the size of the vessel. To this add carbolic acid, salicytic acid or formaldehyde, two spoonfuls to one-half pound of flour, a spoonful of resin, a few drops of oil of cloves, oil of wintergreen, and oil of sassafras. The oil ingredients are added to keep the paste sweet. Add water

gradually, mix well, and beat out the lumps; this is best done when it is a little thick. When all the lumps are dissolved, add water gradually, mixing well before more is added, otherwise lumps will result. When the mixture is reduced to the consistency of cream, put the vessel into the tank, and turn on the heat full force. The mixture must be stirred until the whole thickens to prevent the bottom from thickening first. Set aside to cool. To prevent a crust forming on top, take two or three pieces of



Wooden Paste Box.

burlap, saturate in water, and put on top. Paste can be made with direct steam by inserting a pipe in the vessel, and turning on the steam. The stirring must be continuous, as it thickens rapidly.

Sour paste should never be used, as the fermentation is injurious to leather and invites the growth of molds and bacteria. Pasted material should never come in contact with iron, as it will stain.

To prevent the premature destruction of books by book worms, add to the paste before boiling one part of corrosive sublimate to one thousand parts of water, in addition to the other ingredients mentioned.

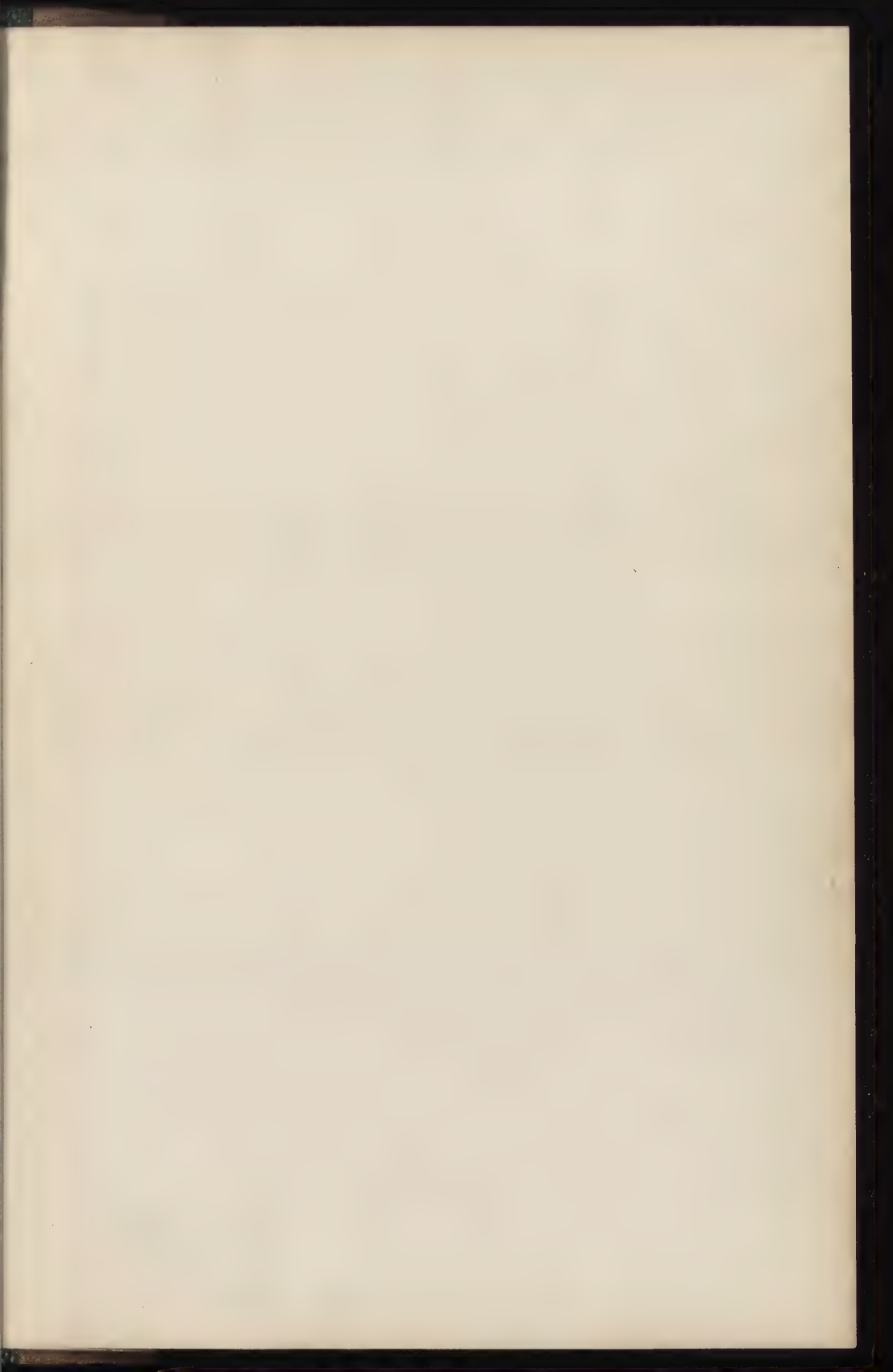
For white paste used in transparent mending, substitute starch, rice or corn flour.

Paste pots are a source of annoyance when left to the careless worker. Cleanliness in handling paste is as essential as for glue, and pots should be thoroughly cleaned once a week. The ideal paste box is a wooden box

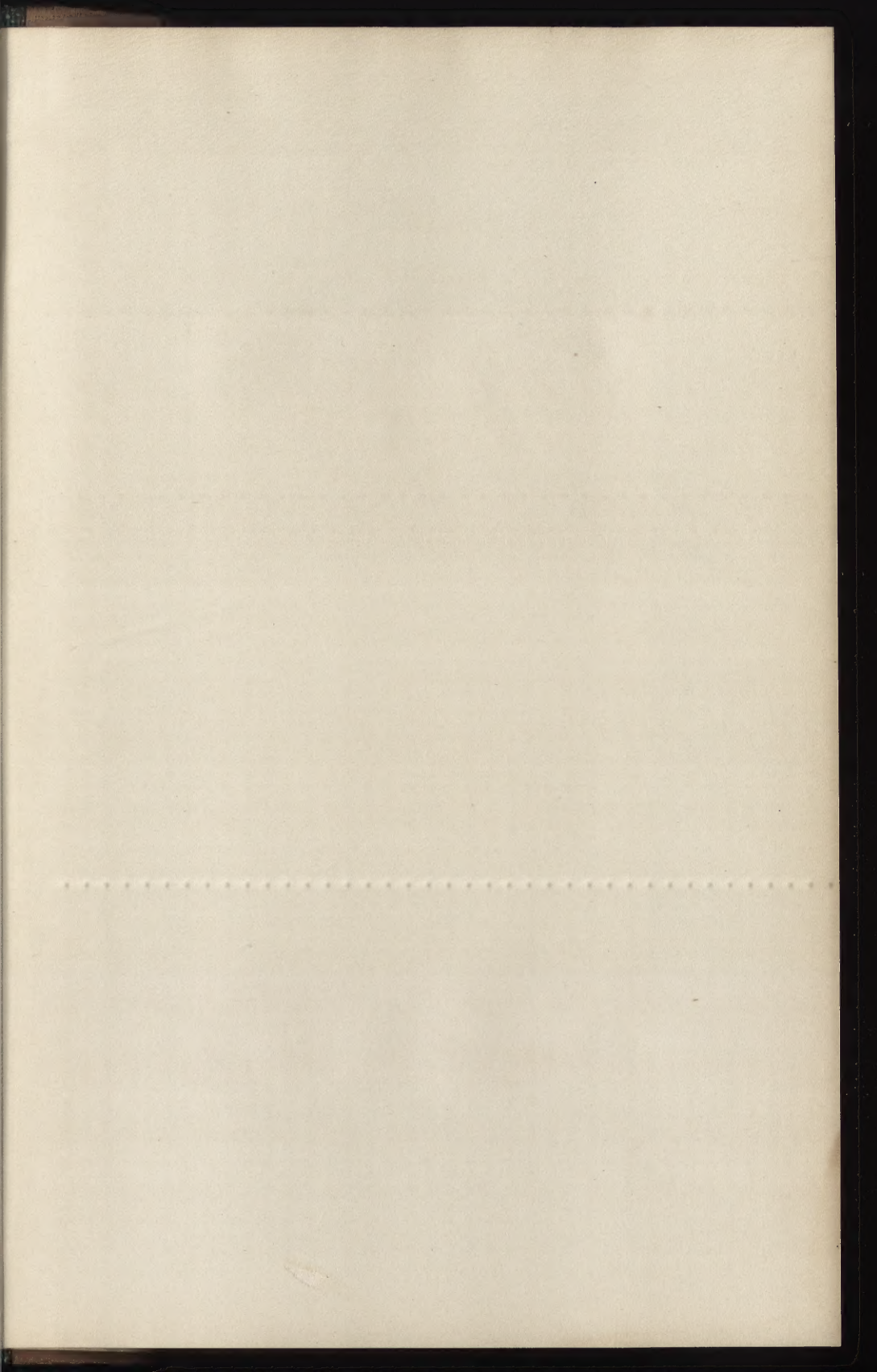
twelve inches square and five inches deep, with a strip of wood across six inches from one end to rub out the paste into the box. This box, when lined with zinc, fills all the requirements of modern establishments.

MOUNTING PASTE.—Take one-fourth of a pound of flour, mix with water gradually, at the same time beat out the lumps and reduce to the consistency of cream. Then add one and one-half ounces of dissolved gum arabic, one teaspoonful of carbolic acid, salicylic acid or formaldehyde, and one ounce of acetate of lead. A teaspoonful of oil of wintergreen and sassafras can be added to sweeten it. The vessel containing this mixture is placed in a tank of water, and heated until it thickens. It must be stirred to prevent burning.

Another paste can be made by adding to the gum arabic, glucose or gelatine, and substituting rice starch for flour.







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